DEPARTMENT OF PUBLIC WORKS OF CANADA

Honourable WILLIAM PUGSLEY, Minister

GEORGIAN BAY SHIP CANAL SURVEY

REPORT

ON THE

PRECISE LEVELLING

YEARS 1904 TO 1907

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1908

[No. 19*a*—1908.]

DEPARTMENT OF PUBLIC WORKS OF CANADA

HONOURABLE WILLIAM PUGSLEY, MINISTER.

A. GOBEIL, I.S.O., DEPUTY MINISTER.

GEORGIAN BAY SHIP CANAL SURVEY

PRECISE LEVELLING

FROM ROUSES' POINT, IN THE STATE OF NEW YORK, TO GEORGIAN BAY, ON LAKE HURON VIA MONTREAL, VAUDREUIL, OTTAWA, PEMBROKE, MATTAWA, NORTH BAY AND THE FRENCH RIVER, AND FROM TORONTO TO NORTH BAY, VIA GRAND TRUNK RAILWAY, INCLUDING VARIOUS BRANCH LINES.

YEARS 1904 TO 1907

CHAS. F. X. CHALONER, *in charge of party*

ASSISTED BY

EUG. GINGRAS, H. J. DUNNE AND J. L. KINGSTON

UNDER THE DIRECTION OF

EUGENE D. LAFLEUR, *Chief Engineer.*

ARTHUR ST. LAURENT, *Ass't Chief Engineer and Engineer-in-Charge.*

C. R. COUTLEE, S. J. CHAPLEAU, *District Engineers.*

DEPARTMENT OF PUBLIC WORKS OF CANADA,

GEORGIAN BAY SHIP CANAL,
CHIEF ENGINEER'S OFFICE,
OTTAWA, January 15, 1908.

Honourable WILLIAM PUGSLEY,
Minister,
Department Public Works.

SIR,—We have the honour to transmit herewith our final report on the precise levelling carried out in connection with the Georgian Bay Ship Canal survey during the years 1904, 1905 and 1906.

The field party was under the charge of Mr. Charles F. X. Chaloner, who was assisted by Messrs. Eugene Gingras, H. J. Dunne and J. L. Kingston.

We take this opportunity of commending the admirable work done by Mr. Chaloner and his party. Neither time nor energy was spared to make a success of the work, which was performed with the greatest good will and ability, under most adverse climatic conditions, and during unfavourable seasons of the year when precise levelling has generally to be stopped on account of the degree of precision which has to be attained. That the work, even under these conditions, was extremely satisfactory will be shown in the report, and great credit is due to Mr. Chaloner and his staff.

We have the honour to be,
Sir,
Your obedient servants,

EUGENE D. LAFLEUR,
Chief Engineer.

A. ST. LAURENT,
Ass't Chief Engineer,
and Engineer-in-Charge.

CONTENTS.

CONTENTS—*Concluded.*

GEORGIAN BAY SHIP CANAL SURVEY.

PRECISE LEVELLING.

INTRODUCTION.

In organizing the field force for the survey of the Georgian Bay Ship Canal route, the formation of a field party for the determination of a common plane of reference for the different sections of the survev. to which all elevations could be referred, was naturally of primary importance.

As the work on the various sections of the survey, extending from Montreal to the Georgian Bay, a distance of 440 miles, commenced at the same time, it was impossible to initiate the levelling on the different sections from a common datum, and each party had to assume a convenient and arbitrary plane of reference for preliminary levelling until such time as it would be possible to connect their net of elevations to a common line of precise levelling.

In geodetic work the plane of reference adopted is mean sea level, and all elevations are referred to that plane, which is obviously of great advantage, for all reductions, comparisons, &c.

Unfortunately, in this country geodetic work is yet in its infancy, and when this survey was commenced there was no system of permanent bench marks, having received their final determination above mean sea level, which could be conveniently tapped from the different sections to be surveyed, except perhaps the levelling done in connection with the Soulanges canal by the Department of Railways and Canals.

In 1883, under the direction of Mr. R. Steckel, C.E., for the Department of Public Works of Canada, a geodetic levelling party was formed, and operated mainly along the Richelieu and St. Lawrence rivers, establishing permanent bench marks and working gradually towards the Atlantic, where a series of tidal observations have been carried on by the Department of Marine and Fisheries, from which records it will be possible, ultimately, to establish a mean tide level in connection with this geodetic levelling. Unfortunately, this work was often interrupted on account of lack of funds and for other reasons, and no final determination has yet been made. It is expected, however, that final results will be available in a year or two, and it is highly important that the work already commenced be gradually extended, and that precise levelling be systematically carried on as a permanent branch of the service.

Very valuable and interesting information in connection with this work can be found in Mr. Steckel's able reports to the Minister of Public Works for the years 1885, 1891, 1898, and 1906.

On the other hand, systematic precise levelling and tidal observations have been carried on in the United States by the Coast and Geodetic Survey, by the Geological Survey, and by the Corps of Engineers for a great many years, and an extensive net of permanent bench marks, with known elevations above mean sea level, as a common datum for all chart work has been established and is being gradually extended.

For a work of such magnitude as that of the canal survey, it was at once recognized as a necessity that a precise levelling party be formed to check finally the transfers already made of the U. S. Coast and Geodetic determinations to our territory, and carry on the same system all along the route of the proposed waterway.

This naturally necessitated a relatively large expenditure, but the character and nature of the work demanded it. Moreover the usefulness of the work as carried out is not limited only to the canal investigation. Permanent bench marks have been established which can be used for other works as initial points for level lines, and the whole levelling has been done with a view of being utilized later in a systematic determination of a common plane for all Canadian harbours on the Great Lakes, which work it is respectfully suggested should be undertaken at once.

PRECISE LEVEL PARTY AND PROGRAMME FOLLOWED.

The precise level party was placed under the charge of Mr. Chas. F. X. Chaloner, who has been doing geodetic levelling for the Department for many years, under the direction of Mr. Steckel, and certainly no better man could have been secured to undertake this work, which required extreme accuracy and great experience.

The programme carried out was the immediate transfer of the elevation of the Coteau Landing bench mark as determined for the Soulanges canal to section No. 1 of the survey; check lines from the U. S. Coast and Geodetic bench mark at Rouses' Point, N. Y., to Coteau Landing and Cornwall; main line from Montreal to North Bay, thence to the mouth of the French river along the proposed waterway, and check line from Toronto to North Bay, with branch lines at different places as given further in detail, in all 945 miles of levelling.

In conjunction with this, automatic gauges were placed at Toronto, Collingwood and French River Harbour, to collect the necessary data for checking precise level lines by water level transfers from United States permanent gauge stations.

The determinations by water level transfer were placed under the direct supervision of Mr. District Engineer, S. J. Chapleau, and a digest of the results is given at the end of this report.

SOULANGES CANAL DETERMINATION AND COMPARISONS.

In regard to the determination of the elevation of the Coteau Landing bench mark by the Soulanges canal staff, during construction, and the final establishment of the elevation of the initial bench mark at Rouses' Point, N. Y., with comparison of results between different operators, the following interesting information was compiled by Mr. District Engineer S. J. Chapleau, and submitted in a report dated June 12, 1905:—

'I beg to call your attention to the following data and recommendations in connection with the final establishment of the elevation of the initial bench mark at Coteau Landing, Que., to which the levels of the canal system, now under investigation, are at present being referred, as upon this bench depends the final reduction of all such levels to that one datum common to all the charts of the Great Lakes, and which result it is most desirable to obtain.

The bench mark above referred to is:—An iron bolt in the southwest corner of the south abutment of the Canada Atlantic Railway bridge over the main road between Coteau Landing and Coteau du Lac, Que., south side of the Soulanges canal.

This Coteau Landing bench mark was connected with the bench mark on the guard lock, Valleyfield, Que., by duplicate lines of levels run via the Canada Atlantic Railway bridge over the St. Lawrence river between Coteau and Valleyfield, and results checked several times by water level transfer and found to be absolutely correct; and the bench mark on the guard lock, Valleyfield, connected by duplicate lines of levels with the international bench mark at Rouses' Point, N. Y., via the Canada Atlantic and Grand Trunk Railways.

The above was carried out under the direction of the late Thomas Munro, M.I.C.E., Mem. Can. Soc. C. E., by Messrs. Allison and Pinhey, Mems. Can. Soc. C. E., during the summer and fall of 1890, during the collection of data bearing on the determination of the Soulanges canal construction datum.

During 1898 the U. S. D. W. Engineers, under the direction of the late Frank A. Davis, ran a duplicate line of levels between the international bench mark at Rouses' Point, N. Y.,

and the bench mark on the guard lock at Valleyfield, Que. Elevations and description of the above terminal benches, and comparative results of these two duplicate lines, are given below:

Rouses' Point.—The United States Coast and Geodetic bench mark is the top of the plinth course, north end of the Chapman building, at Rouses' Point, N. Y., marked thus ⊕. Elevation 110.06.

Valleyfield.—Coping of north wall of lock 14 (guard lock) at Valleyfield, Que., Beauharnois canal, behind heel of post of upper gate.

Canadian determination	156.67
United States determination	156.791
Difference	.121

In the opinion of A. J. Grant, C.E., Mem. Can. Soc. C. E., of the Department of Railways and Canals, who has been officially connected with the St. Lawrence canal system of levels, and is intimately informed regarding them: 'It is fair to assume that if Davis had continued his line of levels to Coteau Landing, the difference between the two lines, Rouses' Point to Coteau Landing, would be only .12 feet in a distance of 52 miles.'

The above limit of error 0.016 ✓ distance in miles between bench marks or that attained by precise methods.

From the above the elevation of the Coteau Landing bench mark would be as follows on the assumption, as before stated, that the difference in height between the Valleyfield bench mark and the Coteau Landing bench mark, is absolutely correct:

Canadian determination	163.32
United States determination	163.44

All the above elevations have been based upon the 'Grist-Mill' bench mark at Greenbush, N. Y., at elevation +14.73.

This elevation—correctly 14.728—above mean tide at Governor's Island, N. Y., was determined in 1877 by Mr. O. H. Tittman, United States Coast and Geodetic Survey, and prior to 1903 was used in the determination of the levels of the northern and north-western lakes. (Appendix 8, United States Coast and Geodetic Survey, Report for 1898-9.)

The new determination of the elevation of this bench in 1903 by the Coast and Geodetic Survey of the United States as a permanent standard, and upon which all the elevations of the northern and north-western lakes are now based, has necessarily changed all permanent bench marks depending upon it, that at Rouses' Point being one of them.

This new elevation of the Greenbush 'Grist-Mill' bench has been determined at 13.863.

The Greenbush-Rouses' Point line was run under the direction of Mr. Molitor during 1902; the Rouses' Point-Valleyfield accepted as determined by the late Mr. Davis.

Rouses' Point, 1882. Is at Rouses' Point, Clinton county, N. Y., on the water table on the north side of the Chapman building, 20.6′ west from the N. E. corner, —— is 1.6′ above ground, elevation 32.9031 metres or 107.955 feet.

Bench Mark Valleyfield. Coping of north wall of lock No. 14 Beauharnois canal. Bench mark is on the iron bolt in strap, 6″ from heel post of upper gate. Elevation 47.143 metres or 154.676 feet.

For the above description, and that of the Greenbush 'Grist-Mill' bench mark, see United States Coast and Geodetic Report for 1903, pages 550, 717 and 551.

Summarized from the above and carrying the 1903 determination through to the Coteau Landing bench mark, we have the following:—

Above mean tide, Governor's Island, N.Y.

	American.		Canadian.	
	Old.	New.	Old.	New.
Greenbush	14.73	13.863	14.73	13.863
Rouses' Point	110.06	107.955	110.06	107.955
Valleyfield	156.79	154.676	156.67	154.56
Coteau Landing	136.44	161.32	163.32	161.21

Mr. Chaloner, in his determination of the Coteau Landing bench mark, used the completed lines of precise levels of Public Works Department, connecting Rouses' Point, N. Y., to Sorel, Montreal and Lachine, Que., and ran a line of precise levels connecting Lachine with Coteau Landing, thus closing the loop.

Mr. Chaloner informs me that the elevation of his initial bench mark at Rouses' Point, which is the same bench mark as that referred to above, and known as Rouses' Point '112,' was taken at 107.80 or 0.15 feet lower than the elevation given above.

Raising Mr. Chaloner's elevation of the Coteau Landing bench mark by this amount, we have for its elevation through Sorel, Montreal, Lachine, &c., 161.07 + 0.15 = 161.22, or a difference of only 0.01 feet from the Canadian, and 0.10 feet from the American determination from the same initial bench mark, a most remarkable result considering the distance; or an error of less than 0.007 $\sqrt{\text{distance in miles}}$.

This part of the above circuit, Lachine-Coteau Landing, run by Mr. Chaloner, checks relatively very closely with lines run under the direction of the late Mr. Munro for the De partment of Railways and Canals.

	Rys. and Canals.	P. W. D.	
B.M. Rouses' Point, N.Y.	110.06	107.80	
B.M. Coteau Landing, Que.	163.32	161.07	
B.M. Lachine. Que.	96.21	93.94	
or correcting to the U.S.C. & G. elevation		107.95	Rouses' Pt.
B.M. Rouses' Point, N.Y.	107.95	107.95	
B.M. Coteau Landing, Que.	161.21	161.22	
B.M. Lachine, Que.	94.10	94.09	

The Lachine bench mark referred to is: 'Horizontal line on copper plug driven into second lower course of stone, on upper or west face of first pier, north end of C. P. Railway bridge across the St. Lawrence river. Bench mark is marked: C B ⊖ M

Considering the above, I would recommend that the final elevation of 161.21 be given the Coteau Landing bench mark, and that all the canal levels be reduced to correspond with that elevation.

I would also recommend that a line of precise levels, under the direction of the Department be made to connect the Coteau Landing bench mark and the United States Lake Survey bench marks A and B at Cornwall, Ont., and the U. S. D. W. bench marks A, B, and 4 at St. Regis, Que., for the double purpose of verifying the above, and connecting the lower St. Lawrence level system; the latter allowing of a double check to the present G. B. S. C. levels through Kingston, Toronto, Collingwood and the French river."

CANAL LEVELS.

It is important to note, at once, before giving a description of the lines run with their results, that all the elevations recorded on the survey plans are based on the Coteau Landing bench mark elevation of 161.21 as described above, and on that of the Lachine bench mark of 94.10, all the levels having been reduced to correspond to this elevation.

At the beginning of the survey these determinations seemed to offer all the degree of accuracy required for the purpose of the canal investigation, and they were adopted for convenience and expediency.

The two check lines, however, made subsequently by Mr. Chaloner from Rouses' Point, N. Y., passing by either of these bench marks through different routes gave the following determinations:—

	Lachine B.M.	Coteau B.M.
Via Valleyfield	93.85	160.99
Via St. Johns, Montreal, &c.	93.85	160.98

or a difference of minus 0.25 for the Lachine bench mark.

This difference, however, is reduced to 0.19 at the Vaudreuil bench mark on west abutment of G. T. Railway bridge over the Ottawa river, which was used as an initial point for the Vaudreuil-North Bay line.

Therefore this variation will exist between the bench mark elevations used for the survey and those as published in this report, excepting when otherwise stated.

PRECISE LEVELLING.

DISTANCES IN MILES COVERED AND ROUTES FOLLOWED.

The levelling performed may be divided into four main lines as follows:—

Line No.	Description of Routes.	DISTANCES. Main Lines.	Branch Lines.	Total Distance.
1	Rouses' Point to Cornwall— *Via* St. Johns, Victoria bridge, Lachine, Vaudreuil and Coteau Landing	126·02	20·77	146·79
2	Vaudreuil to North Bay— *Via* Rigaud, Vankleek Hill, Ottawa, Arnprior, Renfrew, Pembroke, and Mattawa	316·23	22·40	338·63
3	Toronto to North Bay— *Via* Newmarket, Barrie, Collingwood, Orillia, Midland, Gravenhurst, Burk's Falls and Nipissing Junction	301·17	9·13	310·30
4	Rouses' Point to Montreal— *Via* Lacolle Junction, Howick Junction, Valleyfield, Coteau Junction and Lachine	84·85	8·64	93·49
	Totals	821.27	60·94	889·21

This levelling was done in 28 different sections: Line No. 1 comprising sections 16, 15, 1 and 14; line No. 2 comprising sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13; line No. 3 embracing sections 17, 18, 19, 20, 21, 22, 23, 24, 25 and line No. 4, sections 27, 26, 28.

A description of these different sections, in their order as made, with description of routes followed and connecting bench marks, is given as follows by Mr. Chas. F. X. Chaloner, the engineer in charge of the levelling party:—

Section No. 1.—Lachine to Coteau Landing

The levelling was started from $\frac{C}{B \ominus M}$ (Chisel line on end of copper plug, $\frac{}{CCCXCIII}$ driven horizontally into second course above ground, S. W. face of 1st pier, Lachine end of C.P.R. bridge over St. Lawrence river).

The Lachine road was followed up to the G.T.R. bridge at Ste. Anne de Bellevue; here the Ottawa river was crossed in two different ways: the first, using the locks and west shore of Ottawa river; the second, using the G.T.R. bridge; both crossings closing on $\frac{C}{B \ominus M}$ (Top of copper plug driven vertically into east end of north side of west abut- $\frac{}{CCCCXII}$ ment of G.T.R. bridge over Ottawa river at Ste. Anne de Bellevue).

From $\frac{C}{B \ominus M}$, the G.T.R. was followed to Vaudreuil; from here the post road, $\frac{}{CCCCXII}$

along the west shore of the Ottawa river was made use of, as far as the Cascades; then the road along the north side of the Soulanges canal was followed up to Coteau Landing, closing this section on Bench mark 547 (iron bolt driven horizontally into west end of north face of base of south wall of G.T.R. overhead crossing of road to Coteau du Lac, south side of Soulanges canal).

Section No. 2.—Vaudreuil to St. Eugene.

This section was started from $\frac{C}{B \ominus M}$ (Chisel line on end of copper CCCCXV plug, driven horizontally into west face of top course, south side of west abutment of G.T.R. bridge over Ottawa river).

From Vaudreuil, the C.P.R. was followed up to Rigaud; here a branch line was run along the C.P.R. to Pointe Fortune, closing on $\frac{C}{B \ominus M}$ (Chisel line on copper CCCCXXXVII plug, driven horizontally into base, centre of east face of Pointe Fortune post office and general store, owned by Wm. Brown).

From Rigaud the C.P.R. was followed up to 2.84 miles west of St. Eugene station, closing this section on $\frac{C}{B \ominus M}$ (Chisel line on end of copper plug, driven CCCCXLII horizontally into sixth course from top, south end of west face of large culvert 2.84 miles west of St. Eugene station).

Section No. 3.—The Brook to St. Eugene.

This section was started from $\frac{C}{B \ominus M}$ (Chisel line on end of copper plug, driven CCCCXLIII horizontally into first course above ground, under first window from front, north side of the R.C. church at The Brook).

From The Brook the C.P.R. was followed down to Vankleek Hill, where the C.P.R. crosses the G.T.R. branch line to Hawkesbury; here the G.T.R. was used to reach Hawkesbury, closing on $\frac{C}{B \ominus M}$ (Chisel line on end of copper plug, driven horizontally CCCCLI into first course above ground, about centre of west side of R. C. church at Hawkesbury).

From Vankleek Hill the C.P.R. was again used down to 2.84 miles west of St. Eugene station, closing this section on $\frac{C}{B \ominus M}$, already described. CCCCXLII

Section No. 4.—The Brook to Ottawa.

This section was started from $\frac{C}{B \ominus M}$, already described, and run along the CCCCXLIII C.P.R. up to the Central station, Ottawa; here a branch line was run to the foot of the locks, closing on $\frac{C}{B \ominus M}$ (Chisel line on end of copper plug driven horizontally CCCCLVII into twelfth course from top, northwest outside curved wall, lock 1, foot of Rideau canal).

From the Central station the levelling was crossed over to the west side of the canal and up Albert street to the City Hall, ending this section on $\frac{C}{B \ominus M}$ (Chisel line on CCCCLIX

end of copper plug, driven horizontally into first course above ground, under second window from front, south side of city hall building, Ottawa).

Section No. 5.—Carp to Ottawa.

This section is started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCLX}$ (Chisel line on end of copper plug, driven horizontally into third course from top, north side of east wall of G.T.R. bridge over Carp river, .82 mile west of Carp station).

From Carp the G.T.R. was followed down to near Britannia, the overhead crossing of the C.P.R., at $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXI}$ (top of copper plug, driven vertically into coping, south end of west abutment of G.T.R. overhead crossing of C.P.R., seven miles west of Union station, Ottawa.

From this overhead crossing the C.P.R. was followed to the Union station, Ottawa, at $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXVI}$ (Chisel line on end of copper plug, driven horizontally into third course above pavement, south side of private entrance to Union station, Broad street, Ottawa).

From the Union station the levelling was run along Broad, Ottawa, Sherwood and Lloyd streets and G.T.R. track to Ottawa water works building, at $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXVII}$ (Chisel line on end of copper plug, driven horizontally into second course above platform, west side of first entrance from east end of north face of Ottawa water works pump house).

From the Ottawa water works building a loop line was run, via Duke and Ottawa streets; the Union bridge; Bridge, Main, Albert Victoria, Laurier and Youville streets, Hull; the Alexandra bridge; down the east side of the Rideau canal to lock 1, closing this loop line on $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXXIII}$ (Chisel line on end of copper plug, driven horizontally into top course, shore end of east face of lock No. 1, entrance to Rideau canal).

From the Ottawa water works building, the levelling was run along Queen, Wellington, Bank and Albert streets to city hall building, closing this section on $\frac{C}{B \ominus M}$ $\frac{}{CCCCLIX}$, already described.

Section No. 6.—Carp to Sand Point.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCLX}$, already described, and run along the G.T.R. up to Arnprior station; then over to C.P.R. station, to $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXXVII}$ (Chisel line on end of copper plug, driven horizontally into first course above pavement, centre of west face of C.P.R. station at Arnprior).

From the C.P.R. station, the C.P.R. was followed up to .36 mile east of Sand Point station, closing this section on bench mark 582 (+ cut into coping, south wall of west end of C.P.R. culvert, .36 mile east of Sand Point station).

Section No. 7.—Haley's to Sand Point.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXXX}$ (Chisel line on end of copper plug

driven horizontally into second course from top, north end of east face of C.P.R. culvert, 1.22 miles west of Haley station).

From Haley's the C.P.R. was followed down to .36 mile east of Sand Point station, closing this section on bench mark 582, already described.

Section No. 8.—Haley's to Pembroke.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCLXXX}$, above described, and run along the C.P.R. up to Pembroke station, closing on $\frac{C}{B \ominus M}$ $\frac{}{CCCCXCVI}$ (Chisel line on end of copper plug, driven horizontally into first course above pavement, under window, north end of C.P.R. station at Pembroke).

Section No. 9.—Chalk River to Pembroke.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCXCVII}$ (Chisel line on end of copper plug, driven horizontally into southeast end, inner side, near outer rail from round house, main track of turn table of Chalk River C.P.R. yard).

From Chalk river, the C.P.R. was followed down to 520 feet west of Petawawa station, bench mark 591 ("+" cut into coping, centre of east end of concrete culvert, 520 feet west of Petawawa station.)

From bench mark 591, a branch line was run down to the Ottawa river, closing this line on $\frac{C}{B \ominus M}$ $\frac{}{DIV}$ (Chisel line on end of copper plug, driven horizontally into south face of rocky point, some 1,400 feet northwest of Petawawa wharf and about 20 feet from low water mark).

From bench mark 591, the C.P.R. was again followed down to Pembroke station, closing this section on $\frac{C}{B \ominus M}$ $\frac{}{CCCCXCVI}$, already described.

Section No. 10.—Chalk River to Mackey's.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{CCCCXCVII}$, already described, and the C.P.R. was followed up to .78 mile west of Mackey station, closing on $\frac{C}{B \ominus M}$ $\frac{}{DIX}$ (Chisel line on end of copper plug, driven horizontally into solid rock, close to west rail, 300 feet east of mile 25 from Chalk River and .78 mile west of Mackey's station).

Section No. 11.—Deux Rivieres to Mackey's.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{DX}$ (Chisel line on end of copper plug, driven horizontally into large boulder, 10 feet north of track, 38 feet east of mile post 51, from Chalk River, and .19 mile west of Deux Rivieres station).

From this bench mark a branch line was run 1.90 miles down the Ontario shore of the Ottawa river, foot of Deux Rivieres rapids, closing this branch line on $\frac{C}{B \ominus M}$ $\frac{}{DXXIV}$ (Chisel

line on end of copper plug, driven horizontally into solid rock, foot of high cliff, Ontario shore of Ottawa river, some 500 feet below remains of Ranson's old residence, foot of Deux Rivieres rapids.)

From Deux Rivierès the C.P.R. was followed down to .82 mile west of Bissett's station, at $\frac{C}{B \ominus M}$ $\frac{}{DXVI}$ (Chisel line on end of copper plug, driven horizontally into solid rock, 15 feet north of track, 36 feet west of mile post 39, from Chalk River, and .82 mile west of Bissett's station.)

From $\frac{C}{B \ominus M}$ $\frac{}{DXVI}$, a branch line was run along the C.P.R. to main road crossing, .50 mile west of Bissett's station; this main road was followed .75 mile, then a cross road was used down Ontario shore of Ottawa river, closing this branch line on $\frac{C}{B \ominus M}$ $\frac{}{DXXV}$ (Top of copper plug, driven vertically into solid rock, at water's edge, ferry landing, Ontario shore of Ottawa river, foot of steep hill, leading up to Bissett's station.)

From $\frac{C}{B \ominus M}$ $\frac{}{DXVI}$, the main line was again followed down to .78 mile west of Mackey's station, closing this section on $\frac{C}{B \ominus M}$ $\frac{}{DIX}$, already described.

Section No. 12.—Deux Rivieres to Eau Claire.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{DX}$, already described, and run along the C.P.R. up to mile post 71 from Chalk River, at $\frac{C}{B \ominus M}$ $\frac{}{DXXXV}$ (Chisel line on end of copper plug driven horizontally into east face of immense boulder, east side of C.P.R. track, touching mile post 71, from Chalk River, and 1.20 miles east of Mattawa station).

From $\frac{C}{B \ominus M}$ $\frac{}{DXXXV}$, a branch line was run down to Ontario shore of Ottawa river, closing this branch line on $\frac{C}{B \ominus M}$ $\frac{}{DXXXVI}$ (Chisel line on end of copper plug, driven horizontally into southwest face of large boulder, 50 feet from water's edge, Ontario shore of Ottawa river, opposite mile post 71 of C.P.R.)

From $\frac{C}{B \ominus M}$ $\frac{}{DXXXV}$, the C.P.R. was again followed up to .16 mile east of Eau Claire station, closing on $\frac{C}{B \ominus M}$ $\frac{}{DXLIII}$ (Chisel line on end of copper plug, driven horizontally into solid rock, 3 feet west of siding, 1,280 feet south of mile post 84 from Chalk river, and .16 mile east of Eau Claire station).

Section No. 13.—North Bay to Eau Claire.

This section was started from $\frac{C}{B \ominus M}$ $\frac{}{DXLIV}$ (Chisel line on end of copper plug, driven horizontally into second course from top. west end of north face of south abutment of C.P.R. bridge over Chippewa creek, .66 mile east of North Bay station).

From B ⊖ M (C DXLIV), the C. P. R. was followed down to .16 mile east of Eau Claire station, closing on B ⊖ M (C DXLIII), already described.

Section No. 14.—Cornwall to Coteau Landing.

This section was started from United States Lake Survey B.M.A. "B ⊕ M" (A Brass bolt driven vertically into coping, .63 foot south of front face wall, 1.9 feet from rear edge of new entrance lock to Cornwall canal).

From B ⊖ M (A), the south side of the Cornwall canal was followed up to the New York & Ottawa Railway bridge, at B ⊖ M (C DLXI) (Chisel line on end of copper plug, driven horizontally into third course above ground, north face of first pier south of Cornwall canal, of New York & Ottawa Railway bridge over St. Lawrence river).

From B ⊖ M (C DLXI), the fields were crossed to reach the New York & Ottawa Railway embankment, and the track was followed up to the G.T.R. junction, at B ⊖ M (C DLXXX) (Chisel line on end of copper plug, driven horizontally into base course, west end of north face of G.T.R. culvert, 350 feet east of New York & Ottawa Railway junction).

From B ⊖ M (C DLXXX), the G.T.R. was followed down to Cornwall station, at B ⊖ M (C DLXII) (Chisel line driven horizontally into base course, between first and second window from east end of rear or south face of Cornwall station).

From B ⊖ M (C DLXII), a branch line was run down Marlborough street to the foot of the Cornwall canal, closing on B ⊖ M (C DLXII), already described.

From B ⊖ M (C DLXII), the G.T.R. was again followed down to Bridge street crossing, .32 mile east of Coteau station.

From Bridge street crossing, a branch line was run to Delisle river, closing this branch line on B ⊖ M (C DLXXIX) (Chisel line on end of copper plug, driven horizontally into second course from top, west face of south abutment of highway bridge over Delisle river, at Bridge street, east end of Coteau Junction village).

From Bridge street crossing, the levelling was run south, along roadway, down to G.T.R. line to Valleyfield; here the G.T.R. to north side of the Soulanges canal, at B ⊖ M (C CCCCXXVIII) (Chisel line on end of copper plug, driven horizontally into base, east face of north abutment of G.T.R. overhead crossing of road along north side of Soulanges canal, at Coteau Landing).

From B ⊖ M (C CCCCXXVII), the levelling was crossed over to the south side of the Soulanges canal, closing on bench mark 547, already described.

Section No. 15.—Lachine to St. Johns.

This section was started from $B \ominus \frac{C}{CCCXCIII} M$, on C.P.R. bridge at Lachine, already described.

From $B \ominus \frac{C}{CCCXCIII} M$, the C.P.R. was followed to the south side of the Lachine canal; here the C.P.R. embankment was used to get down to the road on the south side of the canal, at $B \ominus \frac{C}{DLXXXI} M$ (Chisel line on end of copper plug, driven horizontally into second course above ground, west face of pier, south end of swing bridge over canal).

From $B \ominus \frac{C}{DLXXXI} M$, the south side of the Lachine canal was followed down to the G.T.R. bridge over the canal, near St. Henri station, at $B \ominus \frac{C}{DLXXXIII} M$ (Chisel line on end of copper plug, driven horizontally into second course from top, west end of north face of south abutment of G.T.R. bridge over Lachine canal at St. Henri).

From $B \ominus \frac{C}{DLXXXIII} M$, a branch line was run along the south side of the canal, as far down as the Wellington or Curran bridge, at $B \ominus \frac{C}{DC} M$ (Chisel line on end of copper plug, driven horizontally into base, south face, west end of guard wall, south abutment of Curran bridge over canal at Wellington street, Montreal).

From $B \ominus \frac{C}{DC} M$, the canal was crossed and the levelling run along Wellington, Brennan, and Commissioner streets to the Examining Warehouse, closing this branch line on $B \ominus \frac{C}{()} M$ (Chisel line on end of copper plug, driven horizontally into first stone above plinth, 70 feet from south end, front of the Examining Warehouse, on Commissioner street).

From $B \ominus \frac{C}{DC} M$, the G.T.R. was followed to the Victoria bridge, at $B \ominus \frac{C}{DLXXXIV} M$ (Chisel line on end of copper plug, driven horizontally into south face of north iron railing, opposite first steel arch, Point St. Charles end of Victoria bridge).

From $B \ominus \frac{C}{DLXXXIV} M$, a branch line was run along the bank of Point St. Charles yard, down to the windmill basin, over the basin opposite the G.T.R. elevator, then across to Commissioner street, at McGill street corner; then along Commissioner street down to opposite Jacques Cartier square, then along the harbour to the Longueuil ferry, closing this branch line on $B \ominus \frac{C}{L} M$ (Chisel line on end of copper plug, driven horizontally into third course above ground, 4½ feet from Forsyth street, east face of south abutment of C.P.R. overhead crossing of Forsyth street at Longueuil ferry landing).

From $B \ominus \frac{C}{DLXXXIV} M$, the G.T.R. was followed across the St. Lawrence river on the Victoria bridge, then along the G.T.R. to the crossing of the C.P.R. at St. Johns, at $B \ominus \frac{C}{DXCVI} M$

(Chisel line on end of copper plug, driven horizontally into fourth course from top, centre of north face, east end of south abutment of G.T.R. culvert, 423 feet north of mile post 26 from Montreal, and 95 feet north of G.T.R. crossing of C.P.R. at St. Johns).

From B $\ominus^{\frac{C}{DXCVI}}$ M, a branch line was run along the C.P.R. to the Chambly canal, closing this branch on B $\ominus^{\frac{C}{DXCVII}}$ M (Chisel line on end of copper plug, driven horizontally into fourth course from top, lower end of curved wall, west side of lock 1, entrance to Chambly canal, at St. Johns).

From B $\ominus^{\frac{C}{DXCVI}}$ M, the G.T.R. was again followed, closing this section at St. Johns station on "+" bench mark 633 ("+" cut into granolithic pavement, 1.4 feet from north edge, 1.6 feet from west edge, northwest pointed end of St. Johns station granolithic platform).

Section No. 16.—Rouses' Point to St. Johns.

This section was started from bench mark "⊕" (⊕ cut into stone plinth, 20.6 feet from northeast corner, north face of the Chapman building, intersection of Lake and Chapman streets, Rouses' Point, N. Y.)

From "⊕", Chapman street was followed up to the Delaware & Hudson Railway; here the track was taken and followed to the boundary line between the United States of America and the Dominion of Canada, at bench mark 639 "+" (+ cut on top of boulder, 14 feet west of Delaware & Hudson Railway, 33 feet north of mile post 48 from Montreal, in boundary line between the United States and Canada).

From bench mark 639 "+," a branch line was run along the boundary line, between the United States and Canada, as far as the Richelieu river, closing this branch line on bench well A. (This bench well consists of two distinct cylinders of cast iron, $\frac{1}{2}$ inch to $\frac{3}{4}$ inch thick, and respectively 9 feet long by 9 inches in diameter, and $7\frac{1}{2}$ feet long by $12\frac{1}{2}$ inches in diameter inside; of these one is placed concentrically over the other; the flange ring $2\frac{1}{2}$ inches wide at the foot of the outer tube, resting on a similar flange $3\frac{3}{4}$ inches wide cast on the inner cylinder, 3 feet above its base. The inner cylinder has a flat circular base, 2 feet in diameter and one inch thick, into which is screwed an iron tube 3 inches in diameter and 1 foot high, closed at the upper end by a cylindrical bronze or gun metal cap, with upper edge, chamfered off at an angle of $33\frac{1}{2}°$ to its vertical axis; all the joints being made perfectly water tight. A hemispherical cavity of the ordinary size is turned in the top base of the cap, to be used as a seat for the ball support of the rod to be lowered into the well).

The well is closed by a heavy cast iron cover, screwed on to the outer cover.

As this bench well had been broken open by unknown persons, a larger cover weighing some 500 lbs. was placed over the inner cover.)

From bench mark 639 "+," at the boundary line, the G.T.R. was followed down to .45 mile north of Lacolle Junction, at B $\ominus^{\frac{C}{DCIII}}$ M (Chisel line on end of copper plug, driven horizontally into second course from top, northwest end face of north abutment of G.T.R. bridge over the Lacolle river, .45 mile north of Lacolle Junction).

From B $\ominus^{\frac{C}{IX}}$ M, a branch line was run along the railway to the second crossing; from here this cross road was taken to reach the main or post road along the Richelieu river, closing this branch line on B $\ominus^{\frac{C}{IX}}$ M (Chisel line on end of copper plug, driven horizontally into stone foundation, one foot above ground, 2 feet from front, north wall of Louis Goudreau's brick house, west side of main river road to St. Johns and some 600 feet north of cross road 1.14 miles north of Lacolle Junction).

From B $\ominus^{\text{DCIII}}_{\text{C}}$ M, the G.T.R. was again followed to Stottsville station, at B $\ominus^{\text{DCVI}}_{\text{C}}$ M (Chisel line on end of copper plug, driven horizontally into second course from top, north face, east end of south abutment of G.T.R. culvert, 335 feet north of St. Valentin de Stottsville station).

From B $\ominus^{\text{DCVI}}_{\text{C}}$ M, a branch line was run down to St. Paul de l'Isle aux Noix village, closing this branch line on bench well "B," placed inside of fence, opposite front door of St. Paul de l'Isle aux Noix hotel).

From B $\ominus^{\text{C}}$ M, the G.T.R. was again followed to Grande Ligne station, at B $\ominus^{\text{C DCVI}}_{\text{DCVIII}}$ M (Chisel line on end of copper plug, driven horizontally into third course above ground, 3 feet from northwest corner, north face of St. Blaise de Grande Ligne station).

From B $\ominus^{\text{(}}$ M, a branch line was run down the Grande Ligne road to the main or post road, at B $\ominus^{\text{DCVIII C}}_{\text{VI}}$ M (Chisel line on end of copper plug, driven horizontally into first course above ground, 11 feet from front, west side of Marsolin Robert's large brick house, at junction of Grande Ligne and Richelieu river roads).

From B $\ominus^{\text{C}}$ M, the post or Richelieu river road was followed for 5.84 miles, closing this branch line on B $\ominus^{\text{VI C}}_{\text{IV}}$ M (Chisel line on end of copper plug, driven horizontally into first stone above ground, 6 inches from front, north wall of François Pinsonneault's large stone house on west side of post road, 1½ miles south of St. Johns G.T.R. station)

From B $\ominus^{\text{C}}$ M, the G.T.R. was again followed down to the G.T.R. water tank at B $\ominus^{\text{C DCVIII}}_{\text{DCXII}}$ M (Chisel line on end of copper plug, driven horizontally into north face of stone base of wooden support of G.T.R. water tank at St. Johns).

From B $\ominus^{\text{C}}$ M, a branch line was run over to the military grounds, closing this branch on bench well "C," placed some 300 feet east of north main entrance to yard of St. Johns military school).

From B $\ominus^{\text{DCXII C}}$ M, another branch line was run along Champlain street down to lock 1, closing this branch line on B $\ominus^{\text{DCXII C}}_{\text{I}}$ M (Chisel line on end of copper plug, driven horizontally into stone foundation, northeast corner of T. Nolin's small brick cottage, opposite lock 1, entrance to Chambly canal, at St. Johns).

From B $\ominus^{\text{C}}$ M, this section was closed on bench mark 633 "+," on St. Johns G.T.R. station platform, already described.

Section No. 17.—Toronto to Newmarket.

This section was started from B $\ominus$ M $\frac{C}{DCXIII}$ (Chisel line on end of copper plug, driven horizontally into first course above ground, 24 feet from south corner, east of James street face of Toronto city hall building).

From B $\ominus$ M $\frac{C}{DCXIII}$, the levelling was run along James, Albert, University, Queen and Simcoe streets, to the Union station, at B $\ominus$ M $\frac{C}{DXCIV}$ (Chisel line on end of copper plug, driven horizontally into base of buttress, west face of southwest corner of south building of Union station at Toronto).

From B $\ominus$ M $\frac{C}{DCXIV}$, the G.T.R. was followed to Bathurst street bridge, at B $\ominus$ M $\frac{C}{DCXVII}$ (Chisel line on end of copper plug, driven horizontally into first course above ground, east end of south face of north abutment of iron bridge over railway tracks, foot of Bathurst street).

From B $\ominus$ M $\frac{C}{DCXVII}$, a branch line was run down to the lake shore, closing this branch on bench mark 647 ("+" cut into coping, southwest corner of large arched portal of Garrison creek sewer, some 800 feet north of west end of Queen's wharf, Toronto bay).

From B $\ominus$ M $\frac{C}{DCXVII}$, the G.T.R. was then followed to Strachan avenue crossing; here a branch line was run up to Queen street, and into Trinity college grounds, closing this branch on B $\ominus$ M $\frac{C}{DCXIX}$ (Chisel line on end of copper plug, driven horizontally into dressed stone base, 31.8 feet from rear end, west face of Trinity college, Toronto).

From Strachan avenue crossing, the G.T.R. was followed to Toronto Junction at B $\ominus$ M $\frac{C}{DCXXI}$ (Chisel line in end of copper plug, driven horizontally into north face of stone pier, under east column of iron trestle, supporting south end of bridge over C.P.R. tracks at Weston road, west end of C.P.R. station at Toronto Junction).

From Toronto Junction, the C.P.R. was followed to the crossing of the G.T.R. line to North Bay, at bench mark 652 ("+" cut into coping, on east end of south wall of C.P.R. culvert, 18 feet W. of G.T.R. line to North Bay).

From bench mark 652, a branch line was run along the C.P.R. to North Toronto station at B $\ominus$ M $\frac{C}{DCXXII}$ (Chisel line on end of copper plug, driven horizontally into base, under centre window, east wall of C.P.R. station at North Toronto).

From North Toronto, the levelling was run along the C.P.R. to Yonge street; then down Yonge street, Marlborough avenue, Avenue road and street; then through Queen's Park to B $\ominus$ M $\frac{C}{DCXXIV}$ (Chisel line on end of copper plug, driven horizontally into base, 1.6 feet south of second basement window from north end of Toronto University Biological Department building, Queen's Park).

From B $\ominus$ M $\frac{C}{DCXXIV}$, the levelling was continued down University, Albert and James streets,

C
closing this branch line on B ⊖ M, on city hall building, already described.
DCXIII

From bench mark 652 "+," the G.T.R. line to North Bay, was followed up to New-
C
market, closing this section on B ⊖ M (Chisel line on end of copper plug, driven
DCXXXIX
horizontally into second course from top, south end of east face of north abutment of G.T.R. bridge over Holland river, north of Timothy street crossing, Newmarket).

Section No. 18.—Barrie to Newmarket.

C
This section was started from B ⊖ M (Chisel line on end of copper plug, driven
DCXL
horizontally into stone foundation, 1.8 feet above ground, and 5.45 feet east of west end door, south or rear wall of post office at Barrie).

C
From B ⊖ M, the G.T.R. was followed down to the Holland river crossing, at New-
DCXL
C
market, closing this section on B ⊖ M, already described.
DCXXXIX

Section No. 19.—Barrie to Collingwood.

C
This section was started from B ⊖ M, above described; and run along Dunlop
DCXL
street, Elizabeth road and first concession road to G.T.R. line to Meaford; here the G.T.R.
C
was followed to Collingwood at B ⊖ M (Chisel line on end of copper plug, driven
DCLXVIII
horizontally into foundation under window, south side of main entrance to G.T.R. station at Collingwood).

C
From B ⊖ M, the levelling was run through the Collingwood ship yard,
DCLXVIII C
closing this section on B ⊖ M (Chisel line on end of copper plug, driven horizontally
DCLXIX
into first course above ground, east corner of face of Collingwood Ship Building Company's pump house).

Section No. 20.—Barrie to Longford.

C
This section was started from B ⊖ M, already described, and run along the G.T.R.
DCXL C
to Longford, closing this section on B ⊖ M (Chisel line on end of copper
DCLXXXVII
plug, driven horizontally into base, north end of west face of solid rock, 60 feet west of main track and opposite mile post 93–133, north side Longford station crossing).

Section No. 21.—Orillia to Midland.

This section was started from bench mark 672 (brass-headed nail driven vertically into second altar step from top, north end of east wall of wooden culvert, 563 feet east of Orillia station).

From bench mark 672, the G.T.R. was followed to Midland, closing this section on $B \ominus \frac{C}{DCC}$ M (Chisel line on end of copper plug, driven horizontally into stone foundation, 1.2 feet above pavement, under space between 4th and 5th first floor windows from front, Bay street wall of Queen's hotel, Midland).

Section No. 22.—Falkenburg to Longford.

This section was started from $B \ominus \frac{C}{DCCI}$ M (Top of copper plug, driven vertically into bed rock, 21 feet west of track, 213 feet south of mile post 127–100 and .18 mile north of G.T.R. station at Falkenburg).

From $B \ominus \frac{C}{DCCI}$ M, the G.T.R. was followed to Gravenhurst at $B \ominus \frac{C}{DCCXI}$ M (Chisel line on end of copper plug, driven horizontally into west face of solid rock, 36.4 feet east of main track and 360 feet north of north semaphore of G.T.R. station at Gravenhurst).

From $B \ominus \frac{C}{DCCXI}$ M, a branch line was run down the G.T.R. to Muskoka lake, closing this branch line on $B \ominus \frac{C}{DCCXII}$ M (Top of copper plug, driven vertically into solid rock, 225 feet west of end of Muskoka wharf, between wharf of Mickle, Dyment & Company and boat house).

From $B \ominus \frac{C}{DCCXI}$ M, the G.T.R. was then followed down Longford station, closing this section on $B \ominus \frac{C}{DCLXXXVII}$ M, already described.

Section No. 23.—Falkenburg to Scotia Junction.

This section was started from $B \ominus \frac{C}{DCCI}$ M, already described, and run up to .08 mile south of Scotia Junction, closing this section on $B \ominus \frac{C}{DCCXLVII}$ M (Chisel line on end of copper plug, driven horizontally into solid rock, 14 feet east of track and .08 mile south of Scotia Junction).

Section No. 24.—South River to Scotia Junction.

This section was started 2.08 miles north of South River station, on $B \ominus \frac{C}{DCCXLVIII}$ M (Chisel line on end of copper plug, driven horizontally into solid rock, 10.8 feet east of track, and 51.4 feet south of mile post 36–191).

From $B \ominus \frac{C}{DCCXLVIII}$ M, the G.T.R. was followed down to .78 mile north of Burk's Falls station at $B \ominus \frac{C}{DCCLXII}$ M (Chisel line on end of copper plug, driven horizontally into sixth course from top, west face of north abutment of G.T.R. bridge over north branch of Magnetawan river, .78 mile north of G.T.R. station at Burk's Falls).

From B $\ominus^{\frac{C}{DCCLXII}}$ M, a branch line was run down the G.T.R. to the Magnetawan wharf, closing this branch line on bench mark 718 ("+," cut into bed rock, 34 feet south of track, and 39.2 feet east of east end of Magnetawan wharf, Burk's Falls).

From B $\ominus^{\frac{C}{DCCLXII}}$ M, the G.T.R. was followed down to .08 mile south of Scotia Junction, closing this section on B $\ominus^{\frac{C}{DCCXLVII}}$ M, already described.

Section No. 25.—South River to North Bay.

This section was started from B $\ominus^{\frac{C}{DCCXLVIII}}$ M, already described, and run along the G.T.R. to Nipissing Junction, at B $\ominus^{\frac{C}{DCCXCV}}$ M (Chisel line on end of copper plug, driven horizontally into solid cliff rock, 10.4 feet southwest of track, and 50 feet north of junction of G.T.R. with C.P.R. at Nipissing Junction).

From B $\ominus^{\frac{C}{DCCXCV}}$ M, the C.P.R. was then run to North Bay station, closing this section on B $\ominus^{\frac{C}{DCCXCVI}}$ M (Chisel line on end of copper plug, driven horizontally into base, centre of southeast face of C.P.R. station at North Bay).

Section No. 26.—Coteau Junction to Aubrey.

This section was started from B $\ominus^{\frac{C}{DLXXIX}}$ M, already described, and run along Bridge street to the crossing of the G.T.R. branch line to Valleyfield; here the G.T.R. was used to the Soulanges canal at B $\ominus^{\frac{C}{DCCXCVII}}$ M (Chisel line in end of copper plug, driven horizontally into top course, north face of up stream end of north abutment of G.T.R. swing bridge over Soulanges canal, at Coteau Landing)'.

From B $\ominus^{\frac{C}{DCCXCVII}}$ M, a branch line was run down to bench mark 547, already described.

From B $\ominus^{\frac{C}{DCCXCVII}}$ M, the G.T.R. was followed to Valleyfield station; from here a branch line was run to the Beauharnois canal, closing this branch on B $\ominus^{\frac{C}{DCCCV}}$ M (Chisel line on end of copper plug, driven horizontally into foundation, one foot above ground, and 29 feet from front north gable end of Larocque House, Valleyfield).

From Valleyfield station, the G.T.R. was followed to the crossing of the canal, at bench mark 730 ("+" cut on coping down stream side of south abutment of G.T.R. bridge over Beauharnois canal).

From bench mark 730, a branch line was run along the north side of the canal up to lock 14, at bench mark 729 ("+" cut on strap, 6 inches from heel post, north end of upper gates of lock 14, Beauharnois canal).

From bench mark 730, the G.T.R. was followed to Aubrey, closing this section on
C
B ⊖ M (Chisel line on copper plug, driven horizontally into second course from top,
DCCCXVIII
west end of south face of small culvert 2,570 feet west of mile post 34, and 2.12 miles west of Aubrey station).

Section No. 27.—Rouses' Point to Aubrey.

This section was started from bench mark ⊕. on the Chapman building, and run up Chapman street to Delaware & Hudson tracks; along Delaware & Hudson Railway to boundary line between the United States and Canada; a branch line was run along the boundary line to bench well, near Richelieu river; from the boundary line the Delaware & Hudson Railway or G.T.R. was followed to Lacolle Junction, at bench mark 737 ("+" cut into second altar step, east end of south ballast wall of small culvert, 210 feet north of semaphore south of G.T.R. branch line to Ottawa, Lacolle Junction).

From bench mark 737, the G.T.R. branch to Ottawa was followed up to the cross road to the R. C. church; here a branch line was run up to the church, clos-
C
ing this branch line on B ⊖ M (Chisel line on end of copper plug, driven horizontally
DCCCXXIII
into stone foundation, one foot above ground, 61.9 feet from front and 38.3 feet from rear end of Ste. Claude de Lacolle R. C. church).

From cross road to Ste. Claude R. C. church, the G.T.R. was followed to
C
2.12 miles west of Aubrey station, closing this section on B ⊖ M, already described.
DCCCXVIII

Section No. 28 Lachine to Coteau Junction.

C
This section was started from B ⊖ M, on Lachine end of C.P.R. bridge, already
CCCXCIII
described, and run along the C.P.R. to the swing bridge over the canal, at bench mark 743 ("+" cut on coping, south end of west side of abutment of C.P.R. swing bridge over Lachine canal).
C
From bench mark 743, a branch line was run down the C.P.R. embankment to B ⊖ M, already described.
DLXXXI

From bench mark 743, the C.P.R. was followed to the overhead crossing of the G.T.R.;
C
here the levelling was run from the C.P.R. embankment to the G.T.R. at B ⊖ M (Chisel
DCCCXXXIX
line on end of copper plug, driven horizontally into second course above ground, 9 feet from west end of north face of south abutment of C.P.R. overhead crossing of G.T.R., .11 mile west of G.T.R. station at Rockfield, Lachine).

C C
From B ⊖ M, the G.T.R. was followed to Mountain street crossing, at B ⊖ M
DCCCXXXIX DCCCXLVII
(Chisel line on end of copper plug, driven horizontally into second course above ground, 6.6 feet from west end of north face of G.T.R. freight shed nearest to tracks, at Mountain street crossing, Bonaventure station, Montreal).

C
From B ⊖ M, the levelling was run along Mountain, McCord and Wellington streets
DCCCXLVII C
to the Curran bridge, closing this branch line on B ⊖ M, on south side of Curran bridge
DC
over Lachine canal at Wellington street, Montreal, already described.

From B $\ominus^{\text{C}}_{\text{DCCCXXXIX}}$ M, near Rockfield station, the G.T.R. was followed up to opposite the Lachine wharf, at B $\ominus^{\text{C}}_{\text{DCCXL}}$ M (Chisel line on end of copper plug, driven horizontally into second course from top, under north rail, east face of ballast wall of G.T.R. culvert, 1,820 feet east of mile post 8, Lachine).

From B $\ominus^{\text{C}}_{\text{C DCCCXL}}$ M, a branch line was run to the Lachine wharf, closing this branch line on B $\ominus^{\text{C}}_{\text{CCCXCVI}}$ M (Chisel line on end of copper plug, driven horizontally into first cut stone above ground, southeast corner of double stone house, second west of 34th avenue, along Lachine road, west of wharf, Lachine).

From B $\ominus^{\text{C}}_{\text{DCCCXL}}$ M, the G.T.R. was followed to Dorval station; here a branch line was run down to the R. C. church, closing this branch line on B $\ominus^{\text{C}}_{\text{CCCXCVIII}}$ M (Chisel line on end of copper plug, driven horizontally into first cut stone above ground, one foot from rear end, west wall of Dorval R. C. church).

From Dorval, the G.T.R. was followed up to Bridge street, .32 mile east of Coteau station; here Bridge street was followed to the highway bridge over Delisle river, closing this last section on B $\ominus^{\text{C}}_{\text{DLXXXIX}}$ M (Chisel line on end of copper plug, driven horizontally into second course from top, west face of south abutment of highway bridge over Delisle river at east end of Coteau Junction village).

ACCURACY OF RESULTS.

The accuracy of the main line of levels from Rouses' Point to North Bay, upon which depended all other subsidiary level lines in connection with the survey, was of supreme importance.

This has been proven to be substantially correct, within all reasonable limits of errors for long level lines, by a check line from Toronto to North Bay and water level transfers from (the self) registering United States gauging stations at Tibbett's Point, N.Y., on Lake Ontario to a similar station established at Toronto, and also by further water level transfers from Mackinaw City and Harbour Beach Lake Huron gauging stations, to Collingwood and French River Harbour, thence by level line through the French river to North Bay (Chippewa bench mark).

The "Chippewa" bench mark at North Bay was therefore the objective point of three different lines of levels, all having for base the United States Coast and Geodetic and Lake Survey system, the different points of which have been determined in elevation above mean sea level as close as it is possible to do it in long distance precise level work.

The approximate length of these different lines is:—

Rouses' Point to North Bay	= 482	miles.
Toronto to North Bay	= 227	"
French River Harbour to North Bay	= 80	"

The resulting elevations are given in detail further in this report, and it will be noted that the difference in elevation of the "Chippewa" bench mark, at North Bay, by the different lines, varies from 0.85 to a little over a foot, difference which it has been possible to adjust satisfactorily by means of the many checks obtained.

Various limits of precision have been fixed in regard to the final error of a series of observations by different precise levelling surveys.

The United States Coast and Geodetic Survey calls for a precision in feet equivalent to 0.02 feet $\sqrt{}$ distance in miles.

The United States Geological Survey has fixed the same limit, and the United States, Mississippi and Missouri River Commission that represented by the formula 0.0126 feet $\sqrt{2 \times}$ distance in miles, for direct lines.

But it has been recognized that a limit of error based on these formulæ, while found satisfactory for short lines, often proves too severe for long lines, and it is generally impossible to maintain it for such a great distance as involved in the levelling under consideration.

The British Ordnance Survey limit of 0.01 feet per mile and that used by the United States Lake Survey of 0.041 $\sqrt{}$ distance in miles would seem to more fairly apply to the present case and the resulting error is well within these limits.

The European International Geodetic Association consider as fair a limit of probable error of 0.0085 feet per mile, while if the error is reduced to half of this figure (0.0042 feet per mile) it is considered that a very high degree of precision has been obtained.

Taking the Rouses' Point, Valleyfield, North Bay, Toronto line, a distance of about 710 miles of actual levelling, the above high degree of precision is more than obtained: 710 x 0.0042 = 2.98 feet, the highest discrepancy found being very little over 1 foot.

RESULTS, COMPARISONS AND ADJUSTMENTS.

In the following pages, the results of the different lines of precise level and water level transfer are given and compared, adjustments required deduced and condensed data regarding water level transfers given.

Datum.—Mean sea level, Atlantic Ocean, New York City.

Initial Bench Mark.—B.M. $\oplus$ Chapman building, Rouses' Point, New York State. Elevation above mean sea level, 107.955.

From this initial bench mark, the levelling was run to Coteau Landing by two different routes as previously described:—

Length of 1st route, 90 miles; length of 2nd route, 50 miles. These two lines were joined at bench mark 547. (Iron bolt driven horizontally into southwest corner of north face of south abutment of G.T.R. overhead crossing of road along south side of Soulanges canal).

Elevation of B.M. 547 via 1st route	160.98	feet.
Elevation of B.M. 547 via 2nd route	160.99	"
Mean	160.985	"
Elevation of B.M. 547 via U.S.D.W. Engineers route to Valleyfield and C.D.W. Engineers to Coteau Landing	161.320	"
Difference	.335	"

The first route as a check was continued up to Cornwall and tied in on U.S.L.S. bench mark A (brass bolt in coping .63 feet south of front face wall and 1.9 feet from rear edge of new entrance lock to Cornwall canal).

U.S.L.S. B $\ominus$ A C M—Via U.S. Engineers	167.031	feet.
" Georgian Bay Canal Survey	166.730	"
Difference	.301	

If we refer all these determinations to bench mark 547 we have the following elevations:—

Via Rouses' Point to Coteau, via St. Lambert	160.98	feet.
" Rouses' Point to Coteau, via Valleyfield	160.99	"
" $B \ominus^{C}_{A} M$ at Cornwall to Coteau, via G.T.Ry.	161.28	"
" U.S.D.W. and C.D.W. Engineers	161.32	"
Mean of 1st and 2nd results	160.985	"
Mean of 3rd and 4th results	161.300	"
Difference	.315	"
Probable correct elevation of B.M. 547 =	161.30	"
1st route elevation of B.M. 547 =	160.98	"
Difference	.32	"

.32 feet in 90 miles = .0035 feet per mile to be added to instrumental determinations from initial point at Rouses' Point through 1st route.

The correction for the 2nd route, 50 miles long, is similarly found to be .0062 feet per mile.

VAUDREUIL TO NORTH BAY.

The initial bench mark for this line is $B \ominus^{C} M$–CCCCXV (Chisel line on end of copper plug, driven horizontally into west face of top course, south end of west abutment of G.T.R. bridge over Ottawa river at Vaudreuil).

Elevation, via Rouses' Point, St. Lambert to Vaudreuil	88.24	feet
Add correction for 77 miles at .0035 feet per mile	+.27	"
Corrected elevation	88.51	"
Elevation, via Rouses' Point, Valleyfield to Vaudreuil	88.30	"
Add correction for 66 miles at .0062 feet per mile	+.41	"
Corrected elevation	88.71	"
Mean of two routes	88.61	"

This line terminates on $B \ominus^{C} M$–DXLIV (Chisel line on end of copper plug, driven horizontally into second course from top, west end of north face of south abutment of C.P.R. bridge over Chippewa creek, North Bay).

Elevation, via Rouses' Point, Vaudreuil to North Bay (as per mean of St. Lambert and Valleyfield routes as corrected to Vaudreuil)	649.99	feet.
Elevation, via water transfer from Tibbett's Point, N.Y., to Toronto and Georgian Bay Canal levelling to North Bay along G.T.R.	650.71	"
Difference	.72	"
Probable correct elevation of $B \ominus^{C} M$–DXLIV	650.71	"

Distance from Vaudreuil to North Bay 316 miles .72 feet in 316 miles = .00228 feet per mile to be added for adjusted elevations between B.M.–CCCCXV and B.M.–DLXIV.

The determination of this elevation for the terminal bench mark at North Bay was done through water level transfer from Tibbett's Point, across Lake Ontario to Toronto and thence by levelling to North Bay.

It was desirable that the long line run from Vaudreuil to North Bay be conclusively checked and herein below condensed data and results of this check are given.

WATER LEVEL TRANSFERS, LAKE ONTARIO.

Simultaneous Gaugings.

Tibbett's Point, N.Y.				Toronto, Ont.			
Month	No. of days.	Monthly mean elevation.	Weighted mean elevation.	Month.	No. of days.	Monthly mean elevation.	Weighted mean elevation.
1906.				1906.			
				June	26	3·114	80·964
July	31	246·40	7638·40	July	31	3·281	101·711
August	31	246·14	7630·34	August	31	3·055	94·705
September	30	245·77	7373·10	September	25	2·965	74·125
October	29	245·66	7124·14	October	28	2·811	78·708
November	30	245·55	7366·50	November	19	2·771	52·649
Arithmetical mean elevation		245·904		Arithmetical mean elevation		2·9996	
Weighted mean elevation		245·91		Weighted mean elevation		3·018	

Zero of gauge — 3·018 below W.S.
Zero of gauge to B. M. 646½ + 11·475.

Weighted mean elevation of Lake Ontario = 245.9105 above M.S.L. New York

Weighted mean elevation of Lake Ontario to zero of automatic gauge	= 3.0180
Zero of Toronto gauge	= 242.8925
Zero of automatic gauge up to B.M. 646½	= +11.4750
B.M. 646½	= 254.3675
B.M. 646½ to zero of Toronto Harbour Commission gauge	= —9.3490
Zero of Toronto Harbour Commission gauge on Victoria pier	= 245.0185

Bench mark 646½ referred to is top of spike, level with coping southeast corner of Garrison sewer portal, about 800 feet northwest of Victoria pier, Toronto harbour.

From Toronto the levelling was run along the G.T.R. to North Bay, joining the level-

ling from Rouses' Point, at B ⊖ M-DXLIV.

SESSIONAL PAPER No. 19a

LAKE HURON.—WATER TRANSFERS.

Water level transfers were made from Mackinaw City and Harbour Beach automatic permanent gauges to Collingwood and French River on Georgian Bay in order to establish a check on level lines to these points.

Harbor Beach.			Mackinaw City.			Collingwood.		
Month.	No. of days.	Monthly mean elevation.	Month.	No. of days.	Monthly mean elevation.	Month.	No. of days.	Monthly mean elevation.
1906.			1906.			1906.		
						May.....	15	·963
						June.....	30	·861
July.....	31	581·45	July.....	31	581·51	July.....	31	·743
August.....	31	581·36	August.....	30	581·38	August.....	31	·869
September.....	30	581·12	September....	21	581·08	September....	30	1·033
October.....	31	580·87	October.....	27	580·85	October.....	31	1·307
November.....	30	580·68	November....	30	580·72	November....	27	1·479
Weighted mean elevation...581·098			Weighted mean elevation.....581.118			Weighted mean readings..... 1·0340		

Weighted mean elevation of Lake Huron..... 581.108 feet.

Weighted mean elevation to zero of Collingwood automatic gauge.....	+1.034	"
Zero of Collingwood automatic gauge, via water transfer	582.142	"
Zero of Collingwood automatic gauge to B.M. $668\frac{1}{2}$.....	+5.66	"
B.M. $668\frac{1}{2}$..... =	587.80	"

Bench mark $668\frac{1}{2}$ is top of iron spike driven vertically into top of plinth, northeast corner of Collingwood Ship Building Co's pump house, Collingwood.

The comparison of results at Collingwood are as follows:—

Elevation of B.M. $668\frac{1}{2}$, via water transfer from Tibbett's Point, N.Y., to Toronto and precise level line to Collingwood.....	587.40	feet.
Elevation of B.M. $668\frac{1}{2}$, via water transfer from Harbor Beach and Mackinaw City, Mich.....	587.80	"
Difference.....	.40	"

The *probable* correct elevation of B.M. $668\frac{1}{2}$ being taken at 587.80 feet and the distance from Toronto to Collingwood being 92 miles, the correction to be made is .00435 feet per mile, to be added up to Collingwood to the instrumental elevations.

SIMULTANEOUS HOURLY GAUGINGS AT COLLINGWOOD, WAUBAUSHENE AND HARBOR BEACH, JANUARY 5–17, 1906.

Mean of 108 *Readings.*

Collingwood.....	580.18	feet above mean sea level.	
Wabaushene.....	580.16	"	"
Harbor Beach.....	580.54	"	"
Difference between Collingwood and Waubaushene.....	=	.02	feet.
Correction from Toronto to Collingwood as above.....	=	.40	"
Correction from Toronto to Waubaushene.....	=	.42	"

From Toronto to Waubaushene, 101 miles. .42 feet in 101 miles = .0041 feet per mile, to be added to obtain adjusted elevations.

SIMULTANEOUS HOURLY GAUGINGS AT COLLINGWOOD, MIDLAND AND HARBOR BEACH. SEPTEMBER 5–18, 1906.

Mean of 149 *Readings.*

Collingwood	580.80	feet above mean sea level.
Midland	580.62	" " "
Harbor Beach	581.13	" " "
Difference between Collingwood and Midland	.18	feet.
Difference between Collingwood and Waubaushene	.02	"
Difference between Waubaushene and Midland	.16	"

From Waubaushene to Midland, 13 miles. .16 feet in 13 miles = .0123 feet per mile to be added to obtain adjusted elevations.

ORILLIA TO NORTH BAY.

From Toronto to Orillia is 80 miles. 80 miles at .00435 feet per mile = .35 feet.

Elevation of $B \overset{C}{\ominus} M$–DXLIV at North Bay, via water transfer from Tibbett's Point, N.Y., to Toronto and precise level line as corrected up to Orillia	651.06	feet.
Probable correct elevation of $B \overset{C}{\ominus} M$–DXLIV	650.71	feet.
Difference	.35	"

From Orillia to North Bay, 140 miles. .35 feet in 140 miles = .0025 feet per mile to be deducted to obtain adjusted elevations.

WATER TRANSFERS, LAKE HURON.

Determinations referring to French River on Georgian Bay.

Harbor Beach.			Mackinaw City.			French River.		
Month.	No. of days.	Monthly mean elevation.	Month.	No. of days.	Monthly mean elevation.	Month.	No. of days.	Monthly. mean readings.
1906.			1906.			1906.		
July	31	581·45	July	31	581·51			
August	31	581·36	August	30	581·38			
September	30	581·12	September	21	581·03	September	30	1·302
October	31	580·87	October	27	580·85	October	27	1·063
November	30	580·68	November	30	580·72	November	17	·631
Weighted mean elevation		581·[illegible]	Weighted mean elevation		581·118	Weighted mean readings		1·0606

Zero of French River gauge = 1.0606 below water surface.

Zero of gauge to B ⊖ M 26 on ring bolt 125 feet south of Ontario Lumber Company's wharf at French River village	+ 11.770	
B.M. 26 to B.M.–DXLIV, "Chippewa creek", North Bay	+59.2352	
Weighted mean elevation of Lake Huron	581.1080	feet.
Weighted mean readings to zero of French River automatic gauge	—1.0606	"
Zero of French River automatic gauge, via water level transfer	580.0476	"
Zero of French River gauge via precise level from Toronto	579.7048	"
Difference	.3428	"

The difference of .3428 is reduced to .10 if we eliminate the readings at French river for the month of November, which seem to have been erratic as compared with gaugings at Harbor Beach and Mackinaw City for the same month, due probably to local weather conditions.

On this basis the following deductions are made:—

Mean elevation of Lake Huron, September and October	580.98	feet.
Mean elevation of Lake Huron to zero of French River gauge	—1.18	feet.
Zero of French River automatic gauge via water transfer	579.80	"
Zero of gauge to B.M. 26, French River	+11.77	"
Elevation of B.M. 26	591.57	"
B.M. 26 to B.M.–DXLIV, Chippewa creek, North Bay	59.24	"
B.M.–DXLIV via water transfer	650.81	"
B.M.–DXLIV via precise level from Toronto and Tibbett's Point	650.71	"
B.M.–DXLIV via Rouses' Point and Vaudreuil, instrumental	649.66	"
B.M.–DXLIV via Rouses' Point and Vaudreuil, adjusted	650.71	"

CHECKING OF PRECISE LEVELS BY WATER LEVEL TRANSFERS.

As mentioned at the beginning of this report the placing and maintenance of automatic continuous gauges in reference to necessary water transfers for proper checks on the level lines was under the immediate direction of Mr. S. J. Chapleau, District Engineer for the Nippissing and western end of the canal survey.

Extracts of his report in this connection, with some deductions made, are given below:—

'The projected level system of the Georgian Bay Ship Canal Survey is referred to the same datum as the United States Coast and Geodetic, and the Lake Survey precise level systems for reasons that are obvious.

'The main line of levels of the Georgian Bay Ship Canal Survey start from Rouses' Point, N.Y., bench mark 1881, Chapman building, and determine by different lines the elevation of B.M.–CCCXCIII at Lachine, upon which the elevations of the bench marks along the route of the proposed canal as far as North Bay depend and terminates in B.M.–DXLIV on abutment of a bridge over Chippewa creek, referred to hereafter as "Chippewa."

From the above bench mark the levels were carried by a special party attached to section No. 1 across Lake Nipissing and down the Pickerel and French rivers, terminating in a bench mark at French River village on Georgian Bay. In addition to the above the terminal

B.Ms. 646½ on the portal of the Garrison street sewer, Toronto harbour, and 668½ on the pump house of the Ship Building Company, Collingwood, were connected by precise level with the "Chippewa" bench.

'In order to establish a check on the "Chippewa" and French river bench marks, "Haskell" automatic recording gauges were established at French River village, Collingwood and Toronto, by which water level transfers were obtained with Mackinaw City and Harbor Beach, Mich., for Lake Huron, and with Tibbett's Point, N.Y., for Lake Ontario.' The Rouses' Point bench and the bench marks upon which the zeros of the United States Lake Survey automatic gauges at Tibbett's Point, N.Y., Harbor Beach and Mackinaw City Mich., depend, are all embraced in the 1903 adjustment of the United States precise level net.

'The records of the United States automatic gauges were kindly supplied by Col. G. J. Lydecker, United States Corps of Engineers, in charge of the United States Lake Survey, stationed at Detroit.

The gauges were run as follows:—

Location.	From	To	Number of days.
French River	September 1...	November 17...	74
Collingwood	May 15...	" 27	196
Toronto	July 1...	" 16...	139
Mackinaw City	July 1...	" 30...	153
Sand Beach	July 1...	" 30...	153
Tibbett's Point	July 1...	" 16...	139

'The method of reduction was as follows:—The gauge sheets show a continuous profile of water surface during the time run, from which 24 hourly readings are obtained between it and the zero line by scale, and the arithmetical mean of the day obtained. The daily means give an arithmetical monthly or period mean, which, with the number of days in each period, yield a weighted mean by method of least squares for the entire time of observation. In deriving the final means given below, the mean for each month has been assigned a weight proportional to the number of days during which observations were taken, weighted mean being: $Xo = \frac{\Sigma P}{\quad}$ (Pn). The difference in elevation between the zero of gauge and adjacent bench mark being checked by "Y" level from time to time during season of running of gauge.

'On comparing the gauge records by days, it was found that breaks occurred during different days at each station; in compiling the results only those days having corresponding dates at the two points being compared, were considered. The prefixes + or — to the weighted means of the gauge readings indicate the position of the zero, above or below the water surface.

WATER LEVEL TRANSFERS.

Lake Ontario.

Tibbett's Point, N.Y.—Mean Lake plane elevation, for July, 31 days; August, 31 days; September, 25 days; October, 25 days and November, 16 days..... 245.964
Toronto, Ont.—Mean gauge readings for same period..... —3.012

Lake Huron and the Georgian Bay.

Harbor Beach, Mich.—Mean Lake plane elevation for July, 31 days; August, 31 days; September, 30 days; October, 30 days, and November, 26 days	581.170
Collingwood, Ont.—Mean gauge readings for same period	+1.073
Mackinaw City, Mich.—Mean Lake plane elevation for July, 31 days; August, 30 days; September, 24 days; October, 29 days, and November, 26 days	581.123
Collingwood, Ont.—Mean gauge readings for same period	+1.078
Harbor Beach, Mich.—Mean Lake plane elevation for September, 30 days; October, 26 days, and November, 14 days	580.942
French River, Ont.—Mean gauge readings for same period	—1.083
Mackinaw City, Mich.—Mean Lake plane elevation for September, 24 days; October, 24 days, and November, 14 days	580.911
French River, Ont.—Mean gauge readings for same period	—1.050
Collingwood, Ont.—Mean gauge readings for September, 30 days; October, 26 days, and November, 14 days	+1.224
French River, Ont.—For same period	—1.083

GAUGE REFERENCE B.MS

Toronto,	No.	646½	11.475 above zero of gauge.
Collingwood,	"	668½	5.66 " " "
French River,	French	26	11.77 " " "

From the above data, together with the results of the precise line connecting the Toronto and Collingwood terminal benches, and the section No. 1 special determination of the difference in elevation between the terminal benches at French River and North Bay, we are able to effect the following summaries:—

Definition.	Elevation.
Toronto, zero of gauge (from Tibbett's Point)	242.952
Toronto, B.M. 646½	254.427
B.M. 668½, Collingwood above B.M. 646½ (precise line)	333.05
Collingwood B.M. 668½	587.477
Collingwood, zero of guage	581.817
French River, zero of gauge	579.510
French River B.M. (French 26)	591.280
"Chippewa" above French River "26" (Section No. 1)	59.235
North Bay B.M. "Chippewa"	650.515
French River, zero of gauge (from Harbor Beach)	579.859
French River B.M. "French 26"	591.629
North Bay B.M. "Chippewa"	650.864
French River, zero of gauge (from Mackinaw City)	579.861
French River B.M., "French 26"	591.631
North Bay B.M. "Chippewa"	650.866
Collingwood, zero of gauge (from Harbor Beach)	582.243
Collingwood B.M. 668½	587.903
Collingwood, zero of gauge (from Mackinaw City)	582.201
Collingwood B.M. 668½	587.861

DIFFERENCES.

Bench Mark "Chippewa."

Route.	Elevation.	Difference.
Tibbett's Point, Toronto, Collingwood, French River, North Bay	650.515	
Harbor Beach, French River, North Bay	650.864	0.349
Mackinaw City, French River, North Bay	650.866	0.351

Bench Mark 668½.

Tibbett's Point, Toronto, Collingwood	587.477	
Harbor Beach, Collingwood	587.903	0.426
Mackinaw City, Collingwood	587.861	0.384

A comparison of the above elevations by automatic gauge reduction with the elevations by the Precise party is as follows:—

B. M.	Location.	Elevation by Precise Party.	Elevation by automatic gauge.	Transfer.	Differences.
646½	Toronto	254·15	254·427	From Tibbett's Point.	+0·277
668½	Collingwood	587·20	587·477	" " "	+0·277
Chippewa	North Bay via Rouses' Point	649·86	650·515	" " "	+0·655
"	" " "	649·86	650·864	" Harbor Beach	+1·004
"	" " "	649·86	650·866	" Mackinaw City	+1·006

'The above digest is on the basis that the differences of elevations between the bench mark "1881" Chapman building, Rouses' Point, N.Y., Harbor Beach and Mackinaw City, Mich., are relatively correct. Such, however, cannot be the case absolutely, though it is reasonable to presume them to be relatively correct, judging by the number of years the gauge records have been kept, the extreme accuracy of the precise level lines entering into their connection, and the rigor of the 1903 adjustment of the United States level net."

The figures given by Mr. Chapleau as to elevations by water transfer differ slightly from the deductions made by Mr. Chaloner. But, of course, these will vary, according to number of simultaneous readings compared, eliminations of certain readings mostly affected by high winds, and extent of observations made. A complete adjustment could only be made after several years of simultaneous observations. The results, however, are close enough for all practical purposes and are a check on computations and precise level results.

The numerous checks obtained have permitted a compensation and adjustment of unavoidable small errors for all precise level lines, which practically eliminates the slight differences at connecting benches.

INSTRUMENT USED AND METHOD FOLLOWED.

The instrument used is the "Tacheometre Sanguet" (auto-reducteur), made in France under the direction of Mr. R. Steckel, for the Department of Public Works, improved and adapted by him for the Geodetic levelling under his direction.

The rods used are thirteen feet in length, made of three pieces of mahogany, screwed together, and divided into feet, tenths, hundredths and half-hundredths.

The method of two simultaneous lines, A and B or double turning points was followed, with two rodmen, one for foresights, the other for backsights, readings being taken at equal distance from the instrument, fore and aft.

The difference in elevation found between two turning points as foresights must be the same when these two points become backsights.

Two sets of level readings are made, the first set being two foresights and then two backsights, and the second set being the reverse, the telescope making a half-circle between the first and the second set.

A double faced level, screwed to the telescope and kept out of adjustment, is used for the second set of level readings.

For full details of the instrument and rod, as well as for a complete description of methods the reader is referred to official reports to the Minister of Public Works, by Mr. R. Steckel, M.Can.Soc.C.E., for the years 1891, 1898 and 1906.

COST.

The field work in connection with the precise levelling commenced in October, 1904, and was completed in November, 1906, at a total expenditure of $29,648.91, or $31.36 per mile.

Apart from this the sum of $5,219.85 was expended in office work, for reductions, computations, &c.

Compared with some other extensive precise levelling of a similar nature in other countries, this rate per mile seems high, but was unavoidable on account of the climatic conditions, which were very unfavourable throughout the whole period of field work.

Generally, precise work of this character is carried on only when weather conditions are favourable, but in this case there was an absolute necessity to continue the field work during late fall, winter and early spring, which are very unfavourable seasons and contributed largely to increase the cost. Under these conditions, it is believed that the cost per mile is very fair, and the results achieved as to precision of work performed rather remarkable.

TABLES OF ELEVATIONS.

In order that the elevations above Mean Sea Level, as determined along the different lines of precise levelling, may be available for future works, tabulated statements have been prepared, giving description of bench marks, their elevation and location. Two different lists are given as follows:—

1st. A reference list of the most important Permanent Benches and their elevations, with descriptive sketch showing exact location.

2nd. A complete reference list, with elevations, of all bench marks, and all other points, where these points are of a fairly permanent nature and can be easily located with the help of the description given.

It will be noticed that two columns of elevations are given, one showing the determinations as made in the field without any correction or adjutsment, the other giving adjusted levels for same points, as deduced after correction of probable errors indicated at connecting bench marks by check lines, the probable errors being distributed in arithmetical ratio to the mileage covered.

However, in transferring the Mean Sea Level datum from the precise level line run from Montreal to North Bay, to the different sections of the survey proper, the adjusted levels were not used as they were not available during the time the field work was in progress. Therefore all elevations shown on plans are based on instrumental determinations without any correction.

It was quite impossible to wait for the check lines to be completed and all the results computed before making the transfers to the territory under survey, as this would have entailed too long a delay to the whole work. As the main base line from Montreal to North Bay progressed, on account of the wide experience of the engineer in charge of the precise levelling, the great care and safe methods used, it was considered quite safe to allow the precise line to be tapped at once by the different sections of the survey and their levels reduced accordingly.

There were several legitimate reasons to believe that these levels could not be, at any point, more than a few inches out from the true determination above mean sea level, and the final results have shown that the elevations as determined are accurate enough for all engineering purposes.

The adjusted levels given are believed to be nearer the correct elevations than the other set of elevations, which was necessarily used, but this can be only settled when the lines receive a final check from a systematic geodetic level development. In so far as this survey is concerned, the results obtained have been satisfactory for all practical purposes, and final adjustments and refinements had to be left for the consideration of a geodetic corps, which no doubt before long will be a permanent branch of the Government service.

As mentioned above, the following lists of elevations refer only to the precise level lines; other elevations in regard to the route surveyed for the canal are fully recorded on the plans. As explained at the beginning of this report all elevations given on the plans are 0.19 to 0.25 higher than they should be if based on the actual figures given in the following list of precise level bench marks, for reasons stated.

Later, when there is time available, it will be possible to list all the bench marks, with their elevations, within the territory surveyed.

The elevations published herein are based upon the Greenbush bench mark, Governor's Island, New York, the accepted elevation of which, since a readjusment made in 1903, is 13.863 above mean sea level.

The initial point upon which these levels depend is a cross-cut on top of plinth course, north end of the Chapman building, at Rouses' Point, Clinton county, in the state of New York; the elevation of this bench mark is derived by a readjustment made in 1903 by the United States Coast and Geodetic Survey, and is now accepted as 107.955 feet above mean sea level, instead of 110.06 as used before the 1903 determination.

The bench marks described are mostly a chisel line on end of copper bolt driven horizontally in solid rock or in the vertical walls of buildings, bridge abutments or other substantial masonry structures Some of the bench marks are simply a cross cut in solid rock or masonry. All standard bench marks are marked thus $B\frac{C}{\ominus}M$ with their respective number in roman numerals cut in the stone.

ROUSES' POINT TO CORNWALL

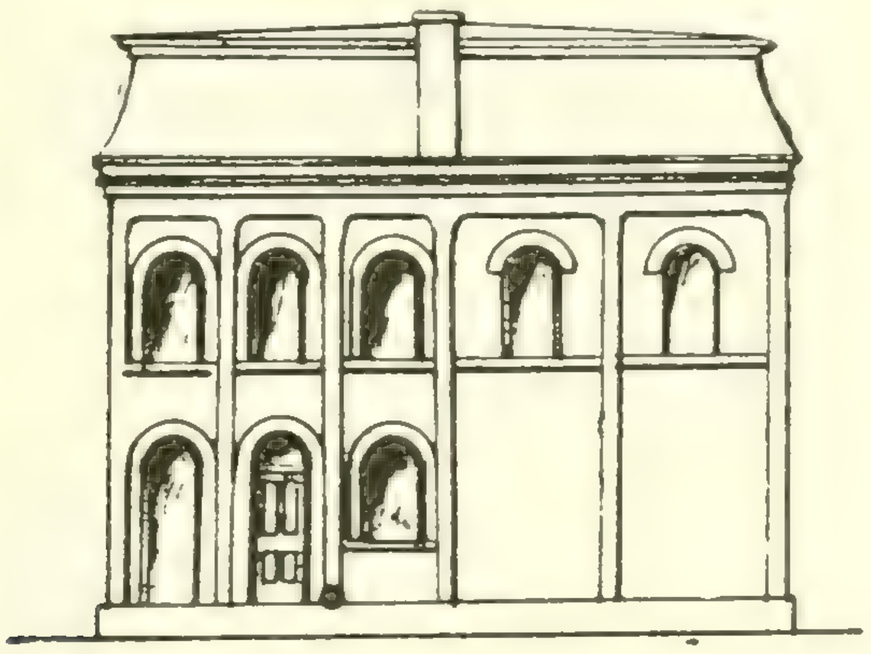
VIA ST. JOHNS, MONTREAL, LACHINE, ST. ANNE DE BELLEVUE, VAUDREUIL, CASCADES, COTEAU LANDING.

DESCRIPTIVE LIST OF MOST IMPORTANT PERMANENT BENCH MARKS.

Datum: Mean Sea Level, Atlantic Ocean at New York.

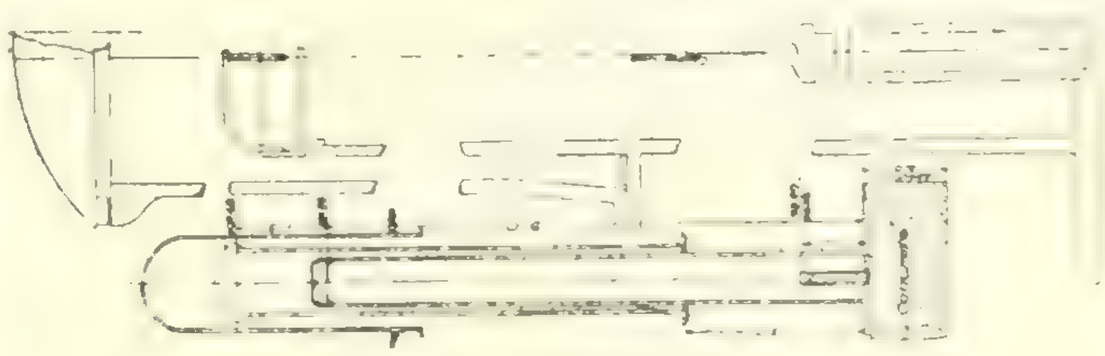
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted
⊕	Top of stone plinth, 20·6 ft. from N.E. corner, 1½ ft. above ground. N. end of Chapman building.....	107·96	107·96

ROUSES' POINT, N.Y.



B.W "A."	Cavity in bronze cap of bench well A, placed in 1884, in boundary between Canada and the U. S. of America.....	93·55	93·60

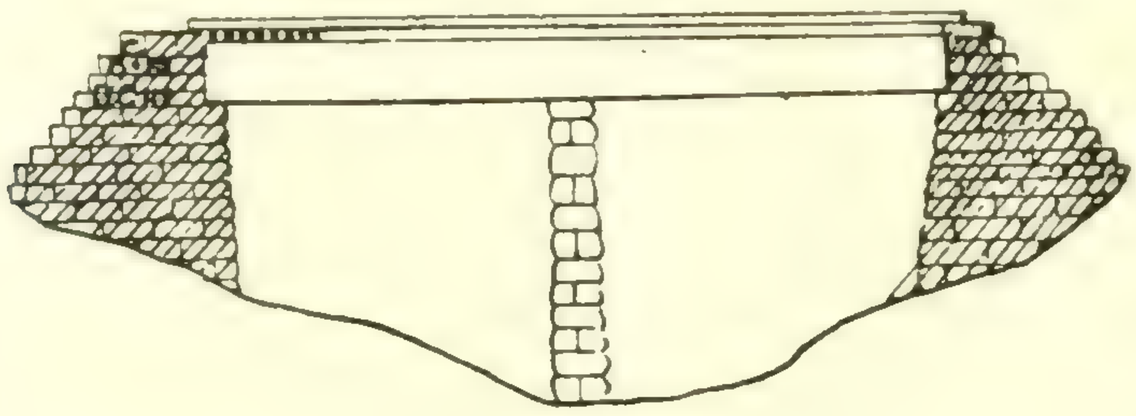
ROUSES' POINT—LACOLLE.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

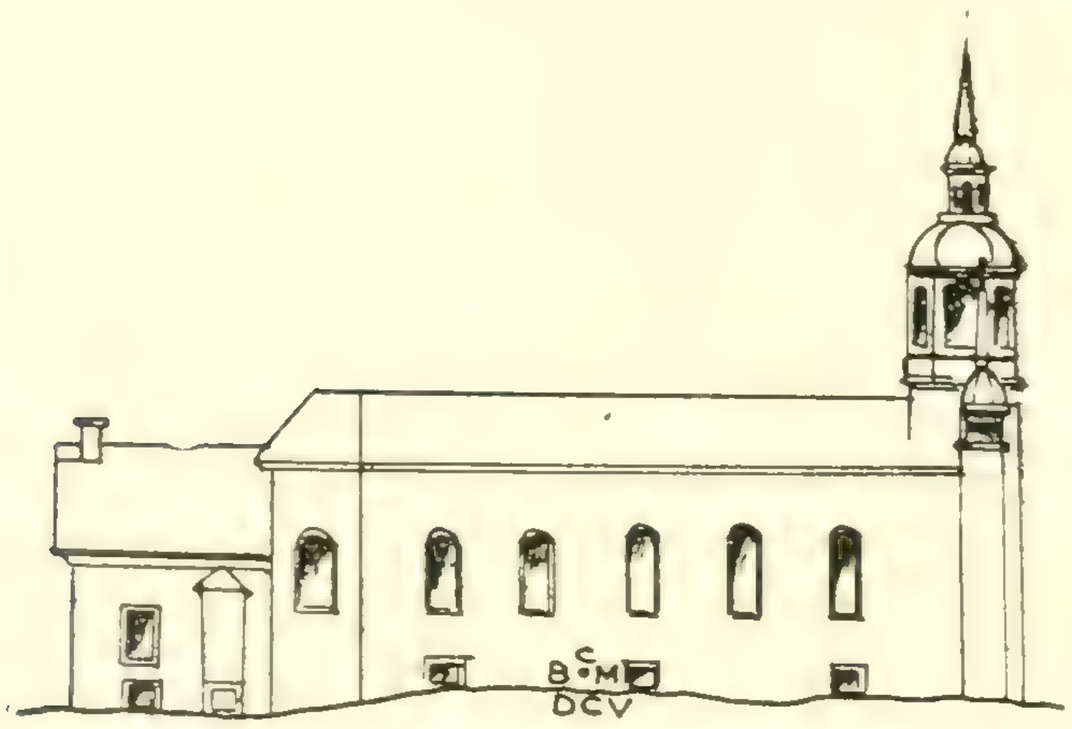
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCIII.	In 2nd course from top, N.W. face W. end of N. abutment of G.T.R. bridge over Lacolle river.....	129·92	129·95

LACOLLE, P.Q.



DCV.	About 1½ ft. above ground, between 3rd and 4 h window from front S. side of R. C. church.....	157·44	157·50

ST. VALENTIN DE STOTTSVILLE, P.Q.

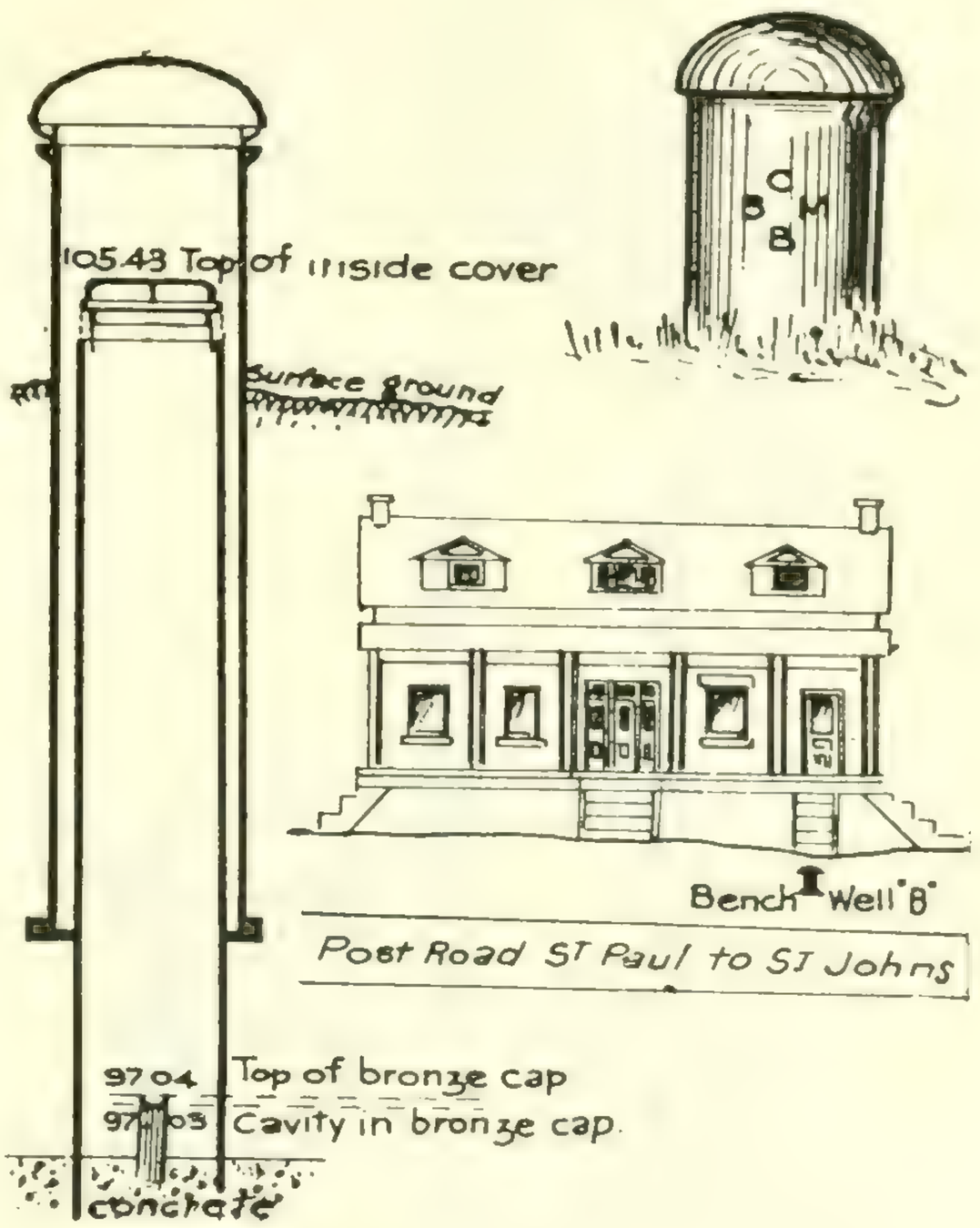


St Valentin de Stottsvill

SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

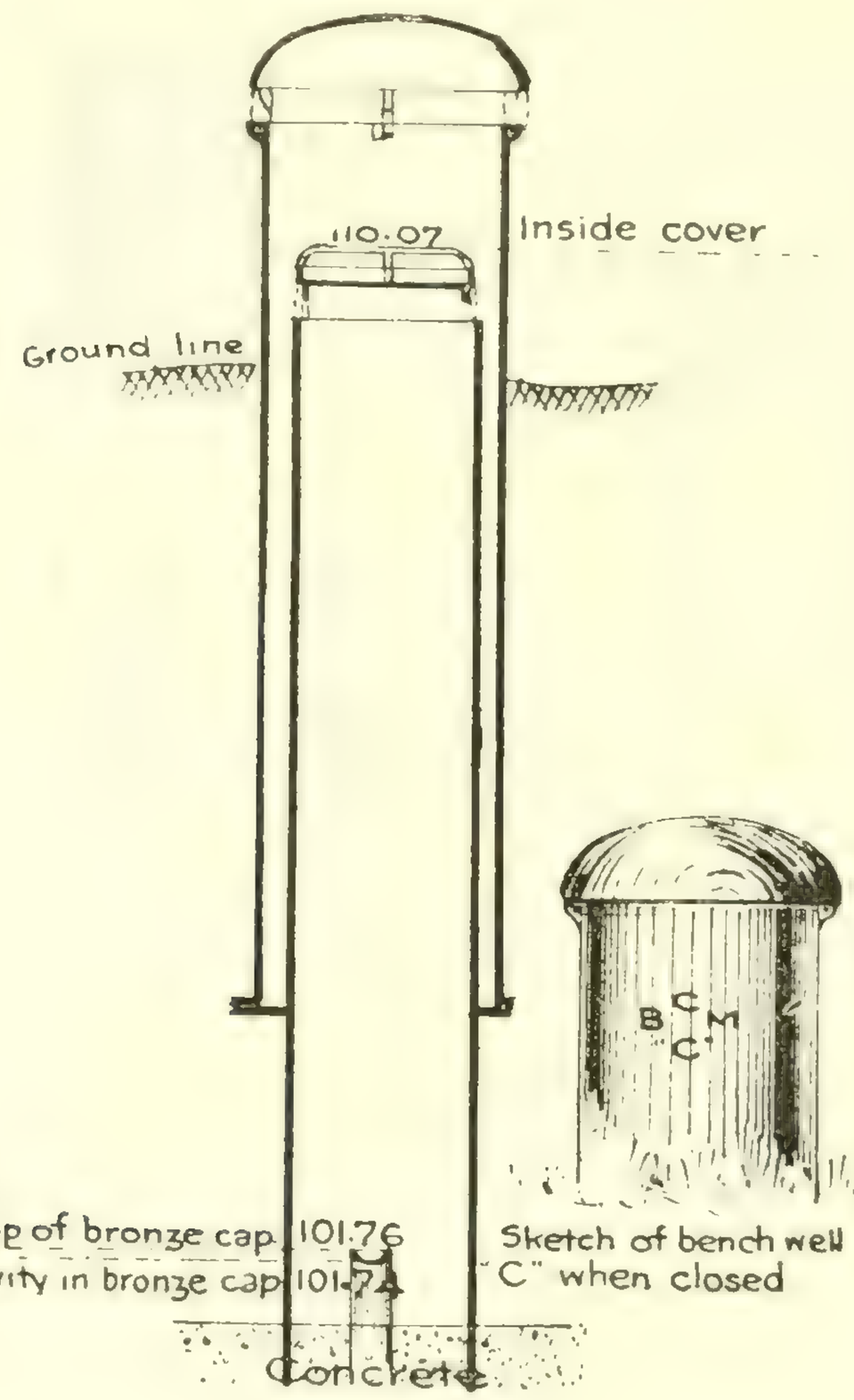
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted
B.W. "B."	Cavity on bronze cap of bench well B, placed in 1884, opposite front door of St. Paul's hotel.....	97·03	97·10
	ST. PAUL DE L'ILE AUX NOIX, PQ.		
DCIX.	In 2nd course from ground, 7·7 ft, S.W. corner stone of R. C. church.	141·69	141·78
	STE. BLAISE DE GRANDE LIGNE, P.Q.		



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

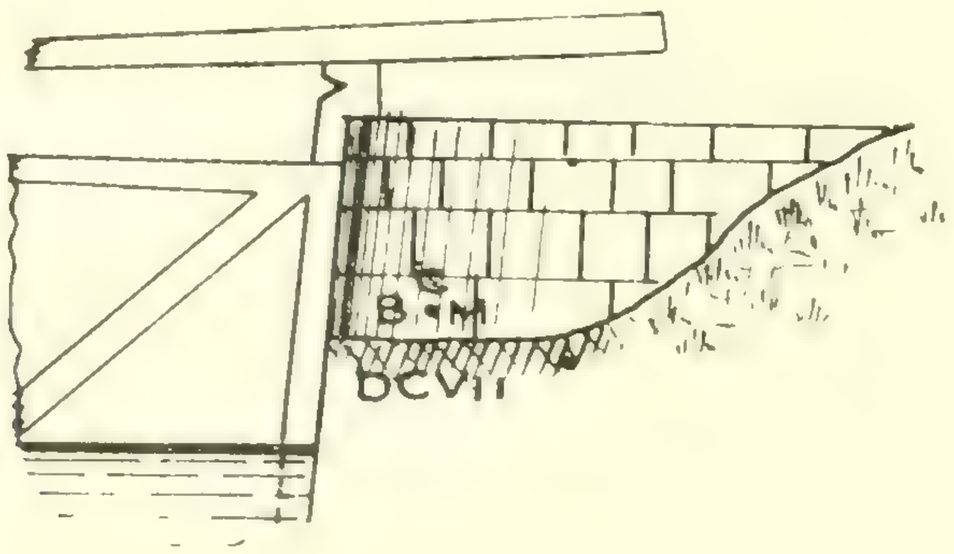
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
B.W. "C."	Top of bronze cap of bench well C, placed in 1884 inside St. Johns barracks grounds.....	101·76	101·89

ST. JOHNS, P.Q.



D^CVII.	In 4th course from top, lower end of curved wall west side of lock 1, Chambly canal.....	96·45	96·59

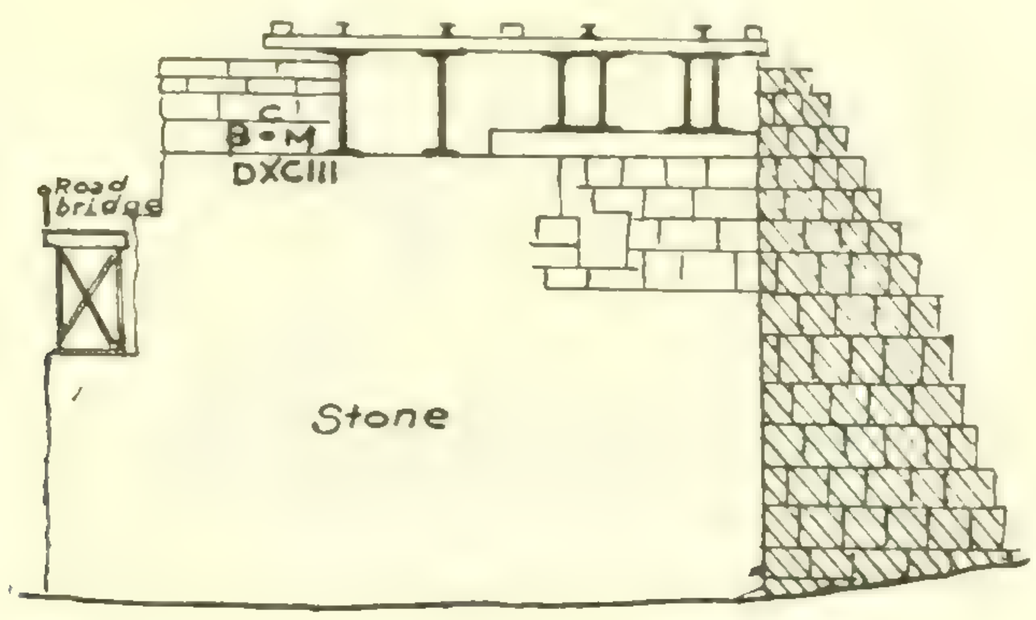
ST JOHNS, P.Q.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

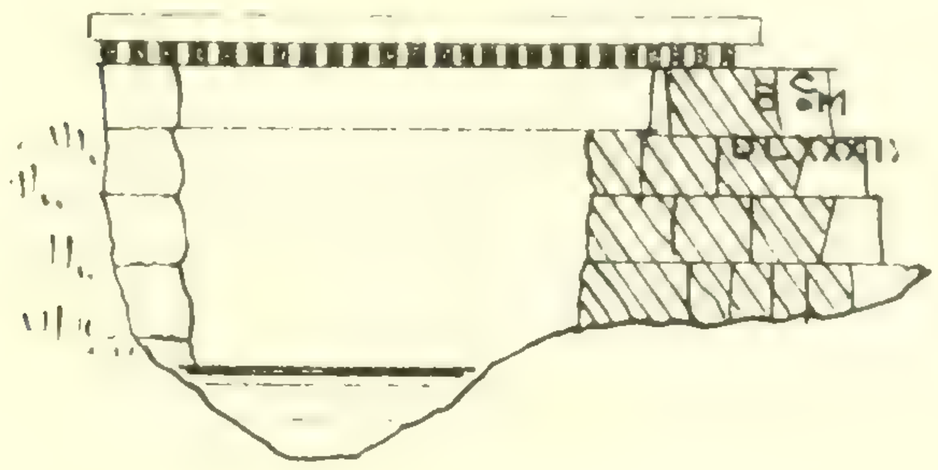
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DXCIII	In 4th course from top, W. end of N. abutment of G.T.R. bridge over Lacadie river, 485 feet S. of mile 20 from Montreal.....	110·37	110·53

Lacadie, P.Q.



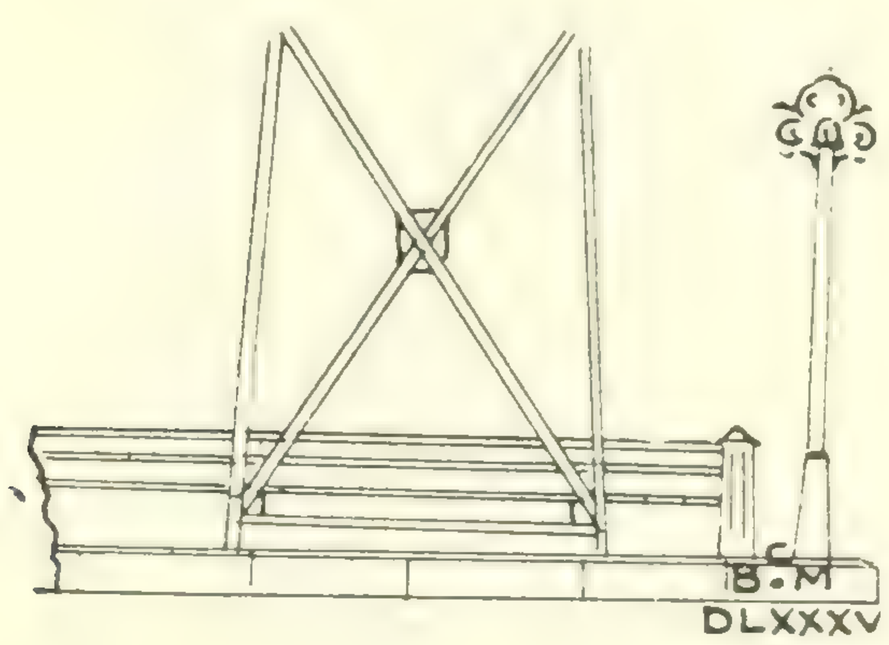
DLXXXIX.	In top course, east face of E. half of N. abutment of beam culvert, 1,570 feet N. of mile 13 from Montreal.....	48·82	49·02

Brosseau, P.Q.



DLXXXV.	In stone base of iron railing, N. side of vehicle road, close to 1st steel arch from St. Lambert end of Victoria bridge.....	67·55	67·78

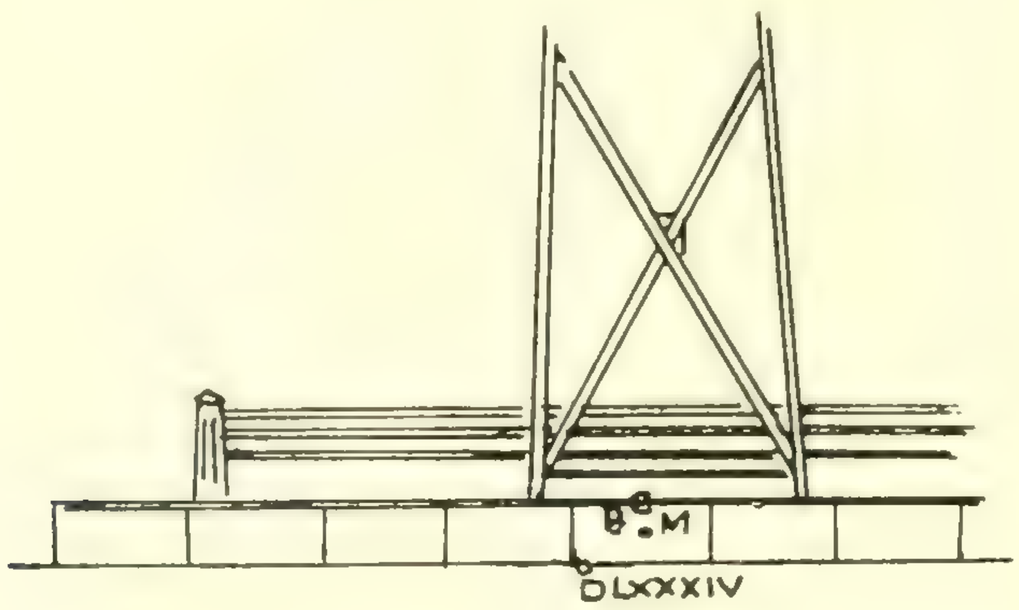
St. Lambert, P.Q.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

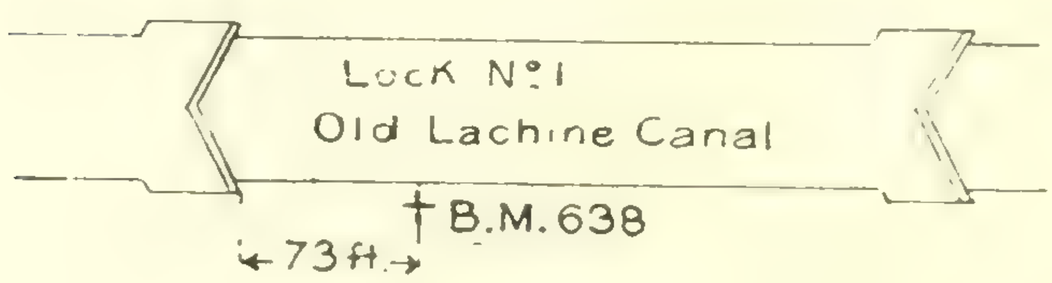
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DLXXXIV.	In S. face of stone base of N. iron railing, opposite 1st steel arch Point St. Charles end of Victoria bridge.....	67·18	67·42

POINTE ST. CHARLES.



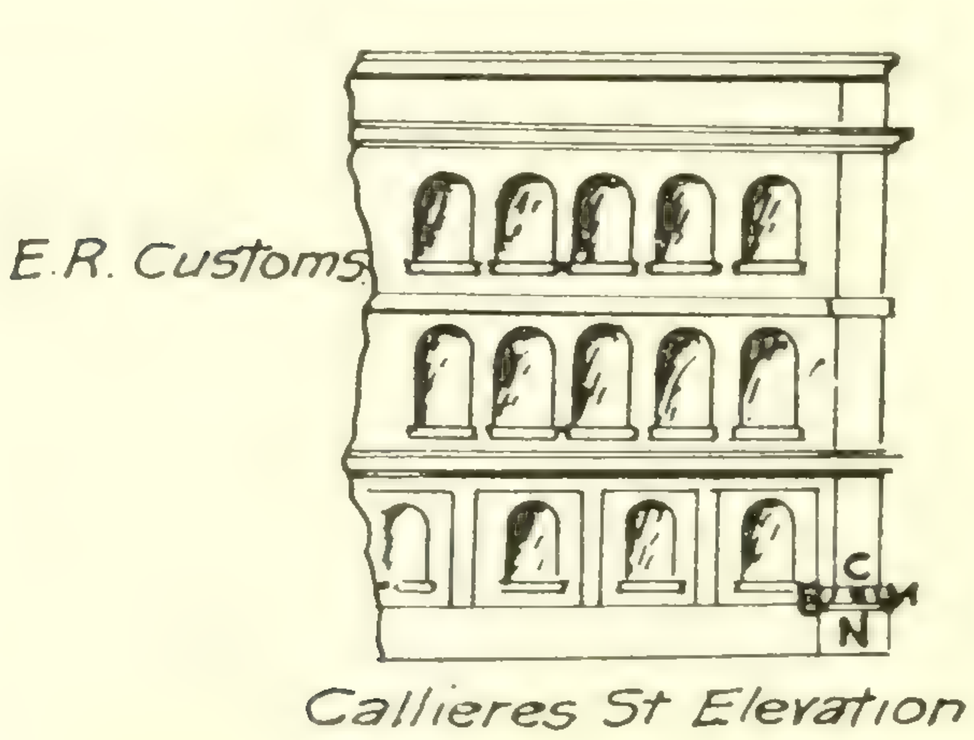
638	†Cut on coping, 96 ft. from S. upper gate old lock 1, Lachine canal.....	36·94	37·19

MONTREAL.



N	In plinth, of Montreal Custom House on Callieres street close to Commissioner street.....	49·03	49·28

MONTREAL.

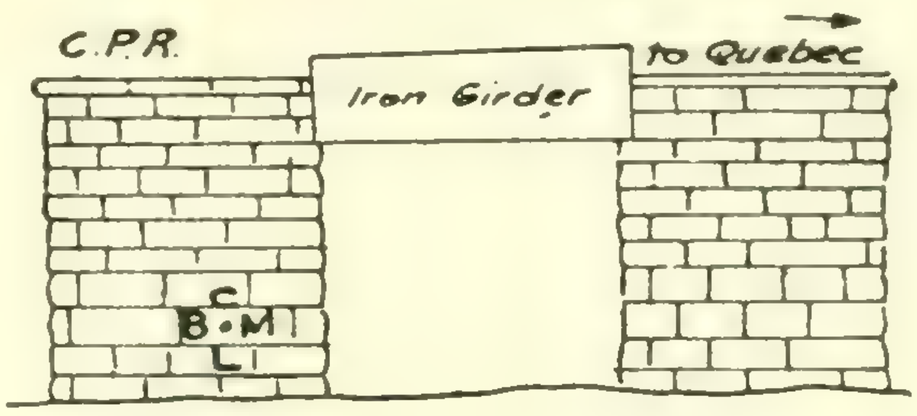


Callieres St Elevation

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

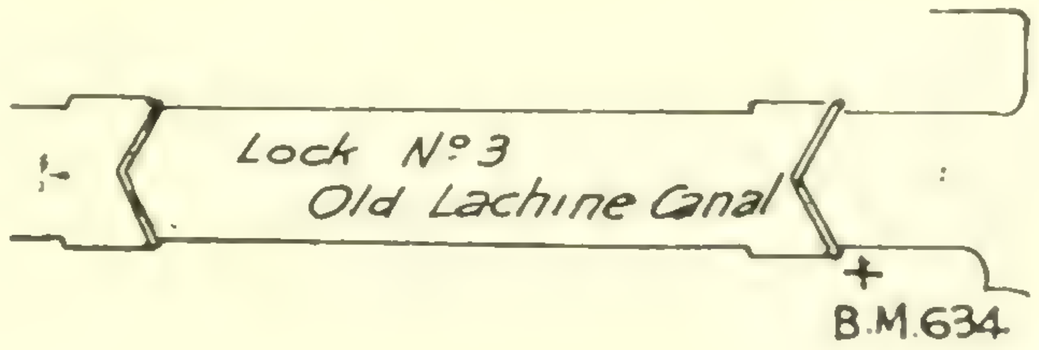
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
L.	In third course from ground 4½ feet from Forsyth street, E. face of S. abutment of C.P.R. overhead crossng opposite Longueuil ferry.....	37·76	38·02

MONTREAL.



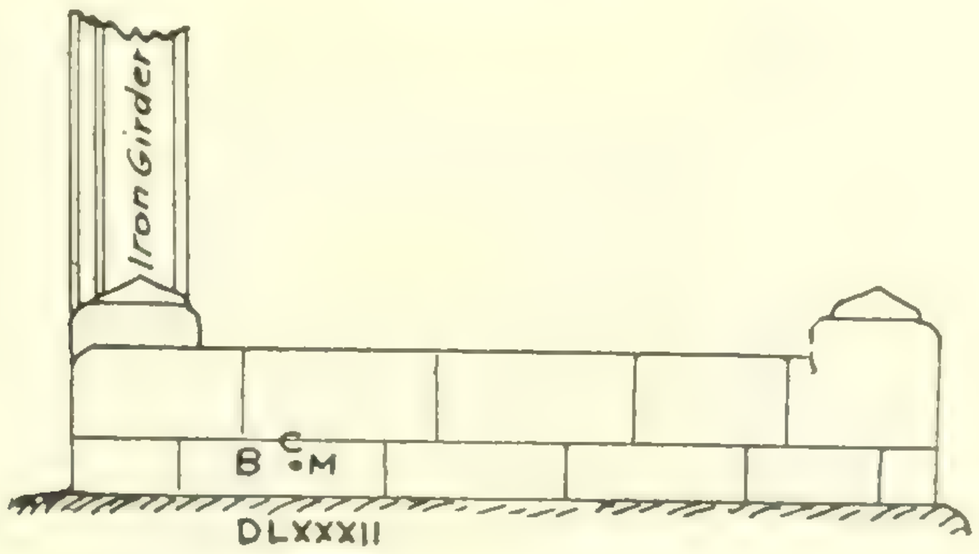
:4	+Cut on coping one foot from S. edge, 5 feet E. of S. lower gate of old lock 3, Lachine canal.....	58·61	58·87

MONTREAL.



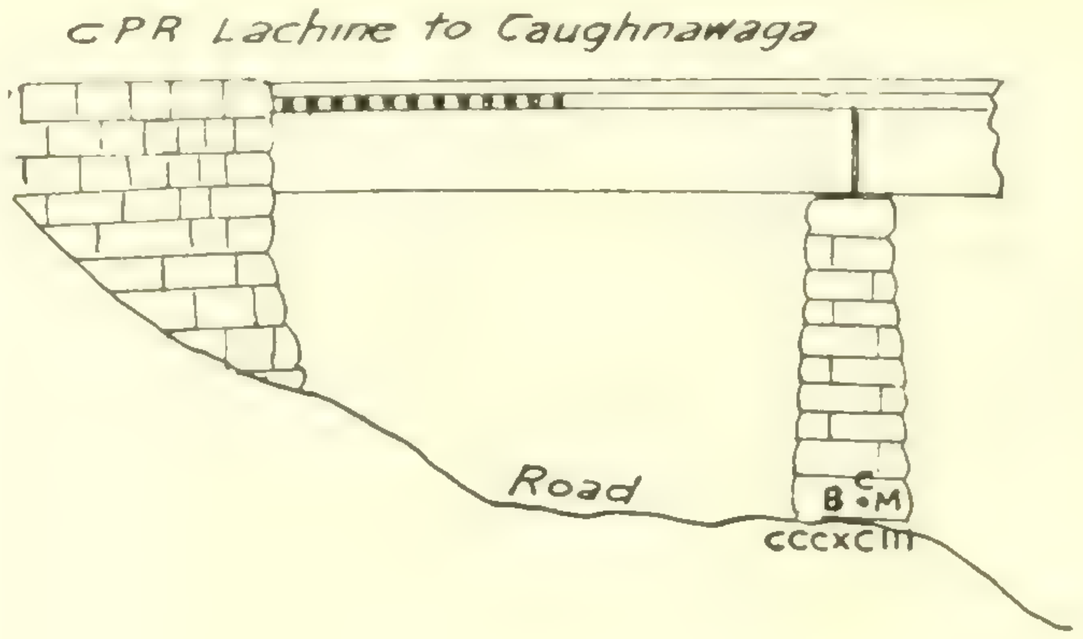
DLXXXII.	n base course, 4½ feet from W. end of E. stone guard wall, S. abutment of Côte St. Paul bridge over Lachine canal	72·74	73·00

MONTREAL.

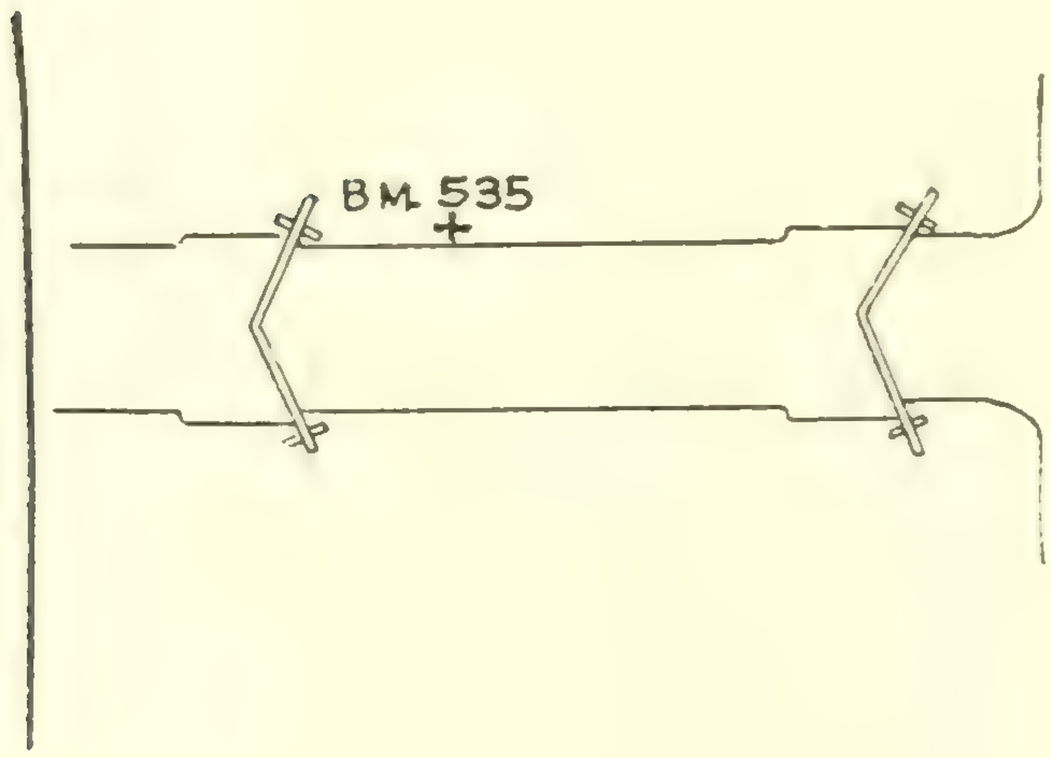


DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
CCCXCIII.	In 2nd course above ground, S.W. face of 1st pier, Lachine end of C.P.R. bridge over St. Lawrence river.....	93·85	94·13
	LACHINE, P.Q.		



535	+Cut on coping above centre of new lock 5 of N. side of Lachine canal.....	74·42	74·71
	LACHINE. P.Q.		

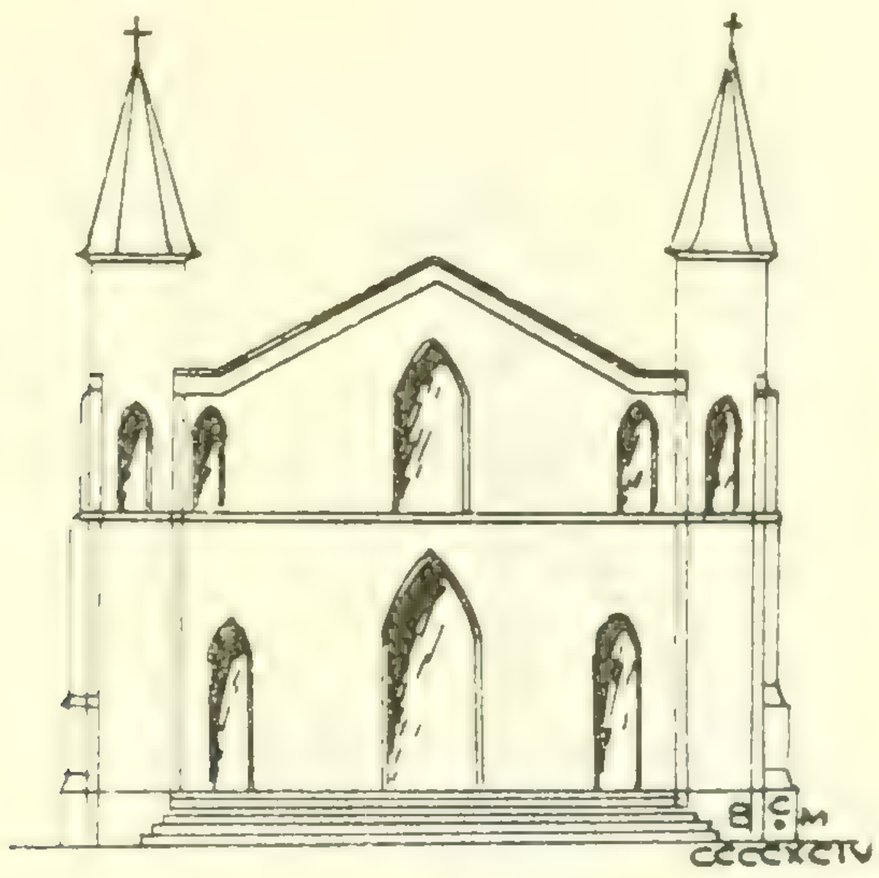


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

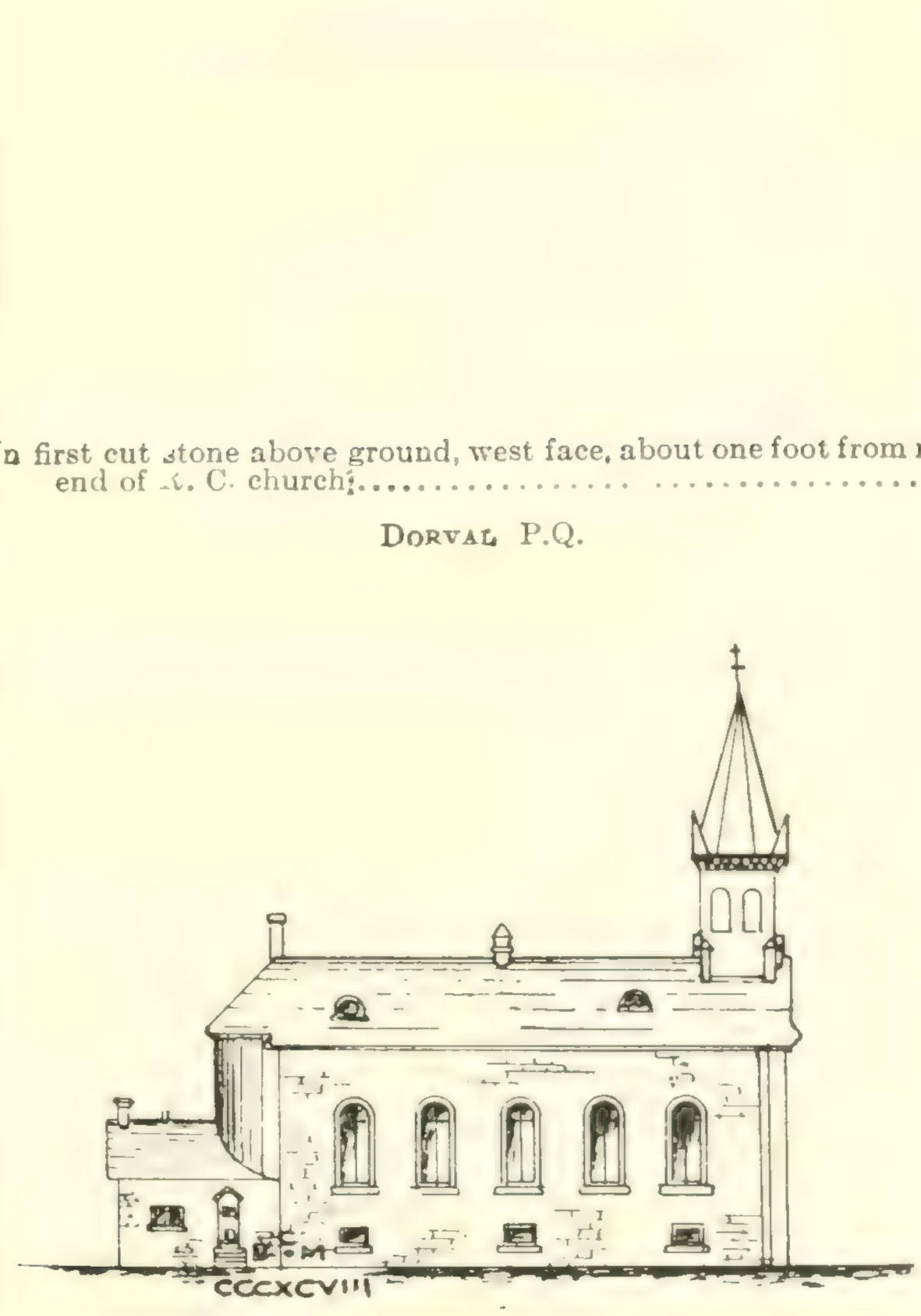
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
CCCXCIV.	In 3rd course above foundation front of buttress, S.E. corner of R. C. church.....	82·87	83·16

LACHINE, P.Q.



CCCXCVIII.	In first cut stone above ground, west face, about one foot from rear end of R. C. church.....	93·53	93·85

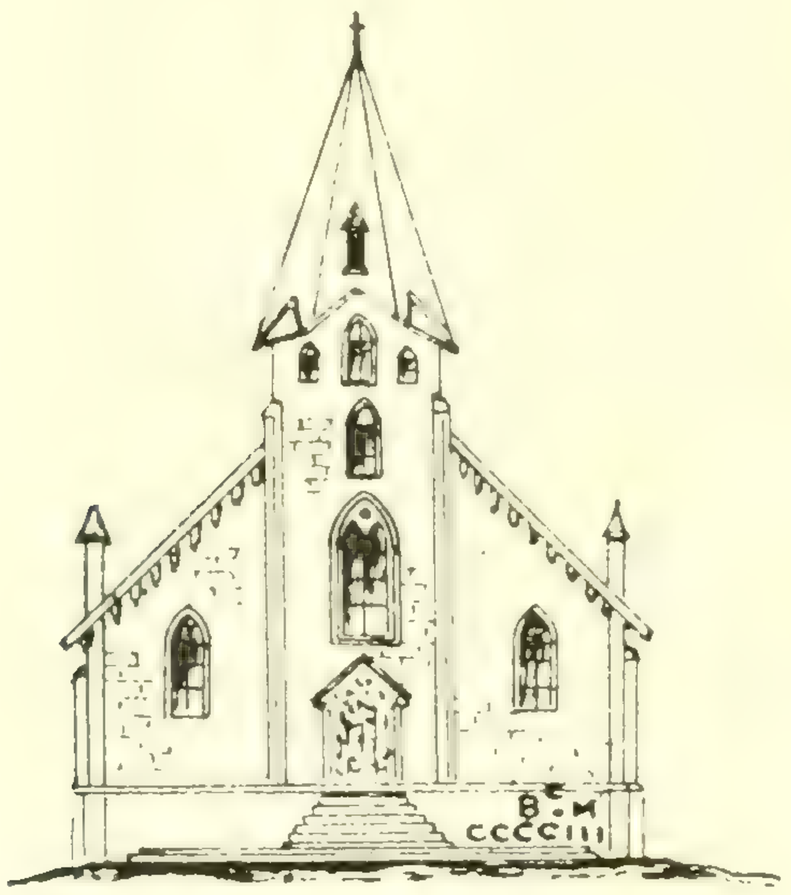
DORVAL P.Q.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

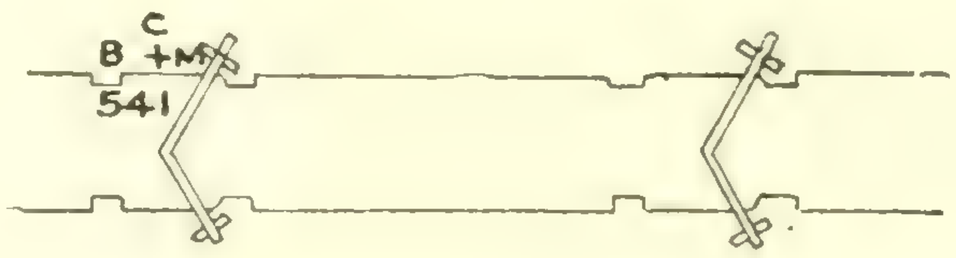
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted
CCCCIII.	In fourth stone above ground, S.E. corner of R. C. church.....	83·95	84·28

POINTE CLAIRE, P.Q.



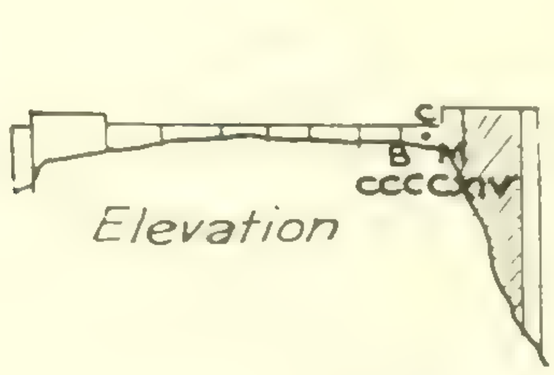
541	+Cut on coping W. recess of lower new lock gate at Ste. Anne de Bellevue.....	81·4	

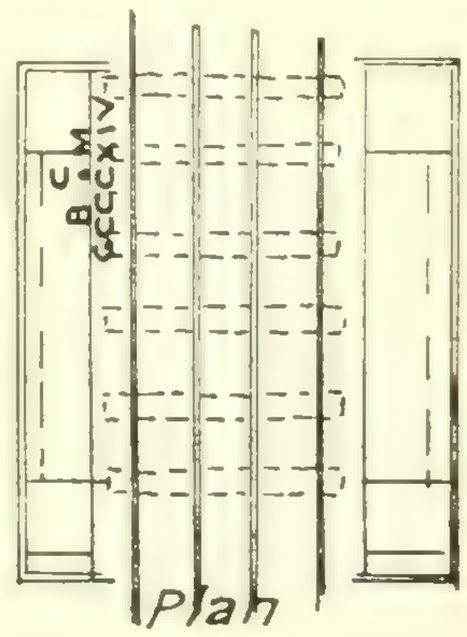
ST ANNE DE BELLEVUE P.Q.



CCCCXIV.	In north face of stone railing about one foot above coping, S. side of E. abutment of G.T.R. bridge between Ile Perrot and Vaudreuil.....	91·89	92·27

ILE PERROT, P.Q.

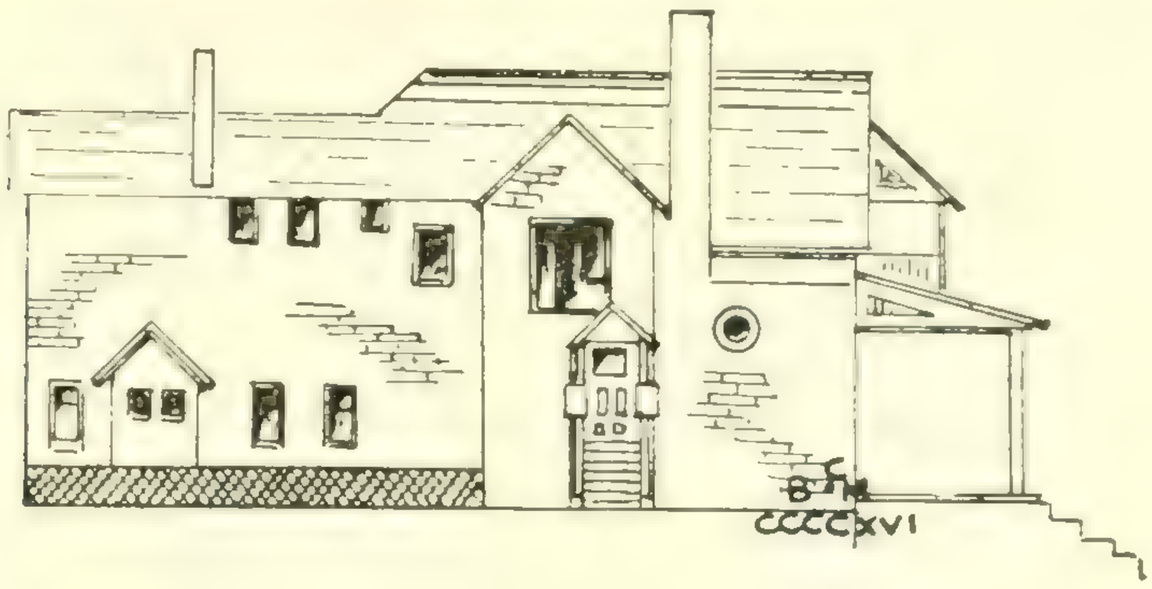




Descriptive List of most Important Permanent Bench Marks—*Continued.*

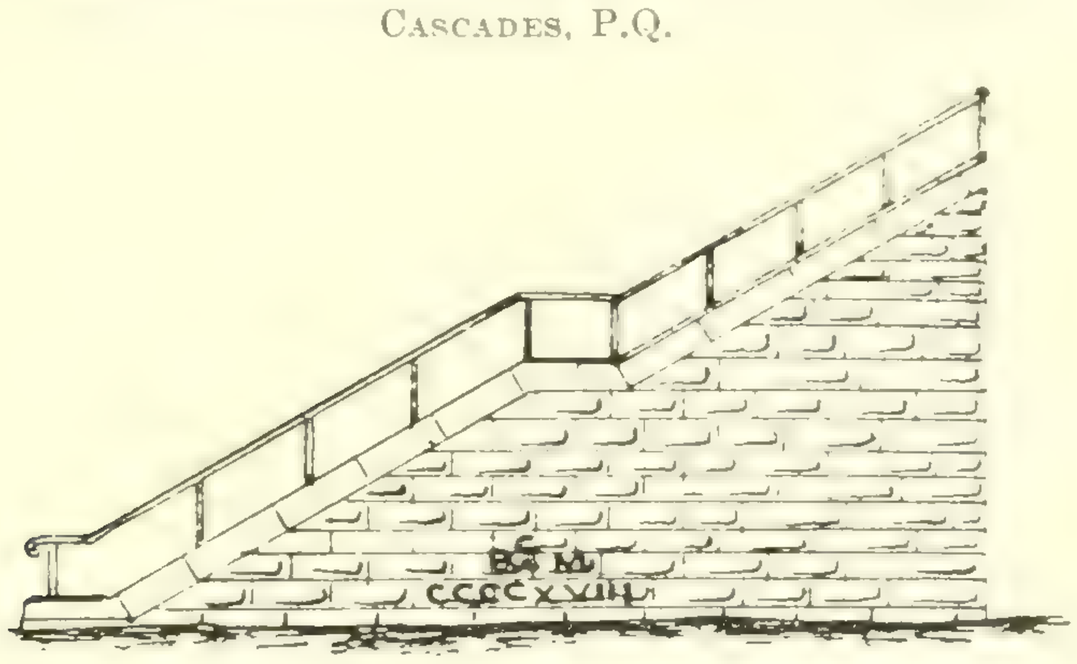
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
CCCCXVI.	About 3 feet above ground, 2 feet from S. W. corner of Geo. Foster's residence 1½ miles from Vaudreuil station.....	84·66	85·05

Vaudreuil, P.Q.



CCCCXVIII.	About 2½ feet above coping N. face of stone stairway leading up to lock 2, Soulanges canal.....	95·37	95·75

Cascades, P.Q.



CCCCXXI.	About 2 feet above coping N. face of stone stairway leading up to lock 4, Soulanges canal.....	142·02	142·39

Cascades, P.Q.

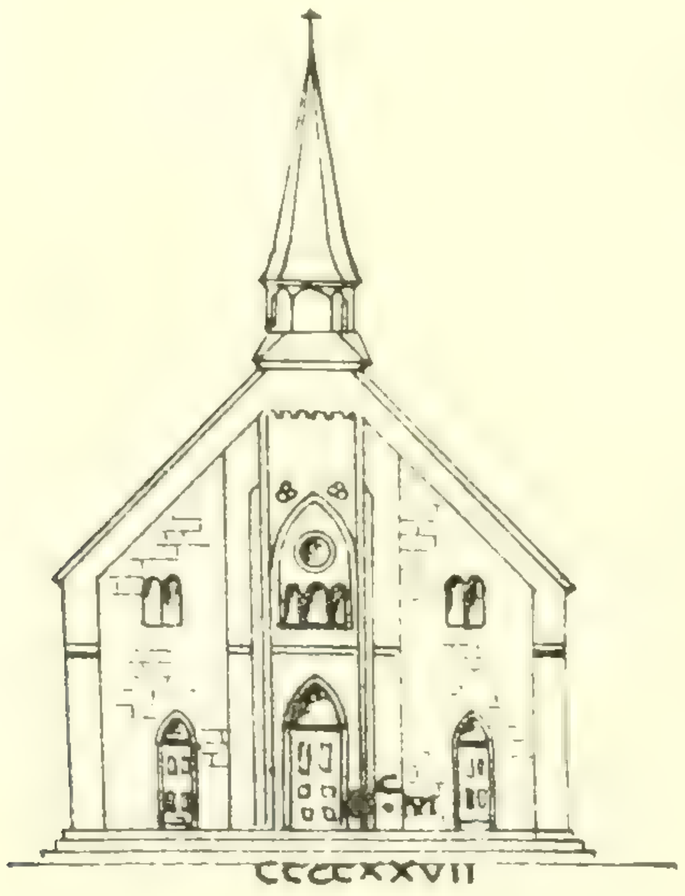
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
CCCCXXIII.	About 1½ feet above top step, N. face of stone buttress, N.W. corner of R. C. church	158·39	158·75

Cedars, P.Q.

CCCCXXVII.	In first stone above plinth, W. side of E. entrance to R. C. church.	158·48	158·81

Coteau du Lac, P.Q.

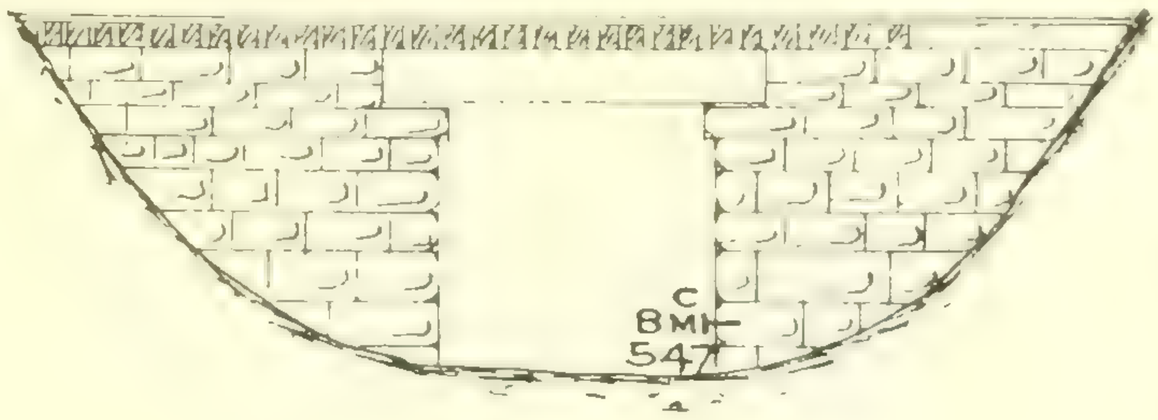


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

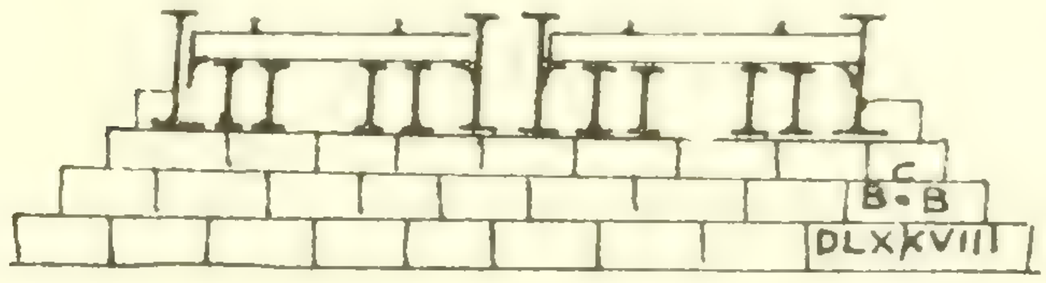
Bench Marks.	Description and Location.	Elevations	
		Instrumental.	Adjusted.
547	Iron bolt driven horizontally into N. face S.W. corner G.T.R. bridge over canal road to Coteau du Lac, S. side of canal	160·98	161·30

Coteau Landing, P.Q.



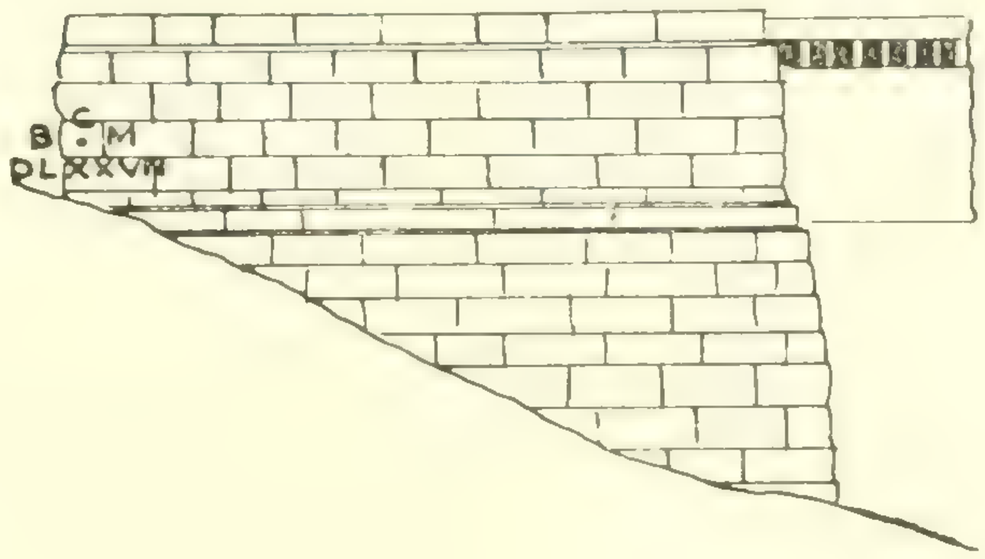
DLXXVIII.	In 2nd course from base, S. end of E. abutment of G.T.R. bridge, 660 feet E. of St. Zotique station	154·65	154·97

St. Zotique, P.Q.



DLXXVII.	In 4th course from top W. end of S. face of W. abutment of G.T.R. bridge over River Beaudette.....	169·45	169·76

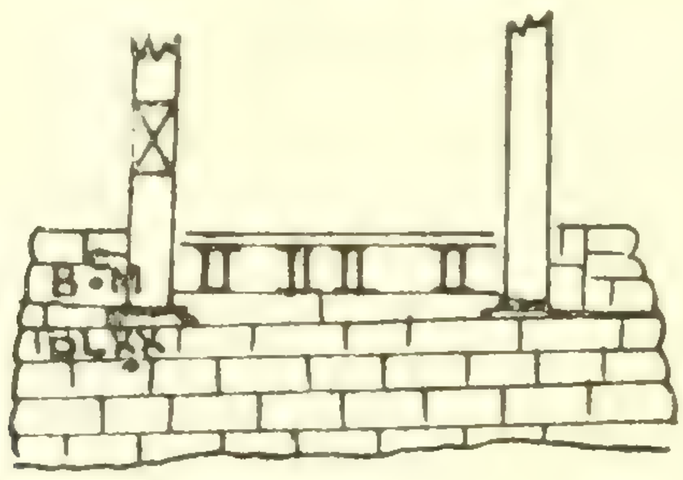
Riviere Beaudette, P.Q.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

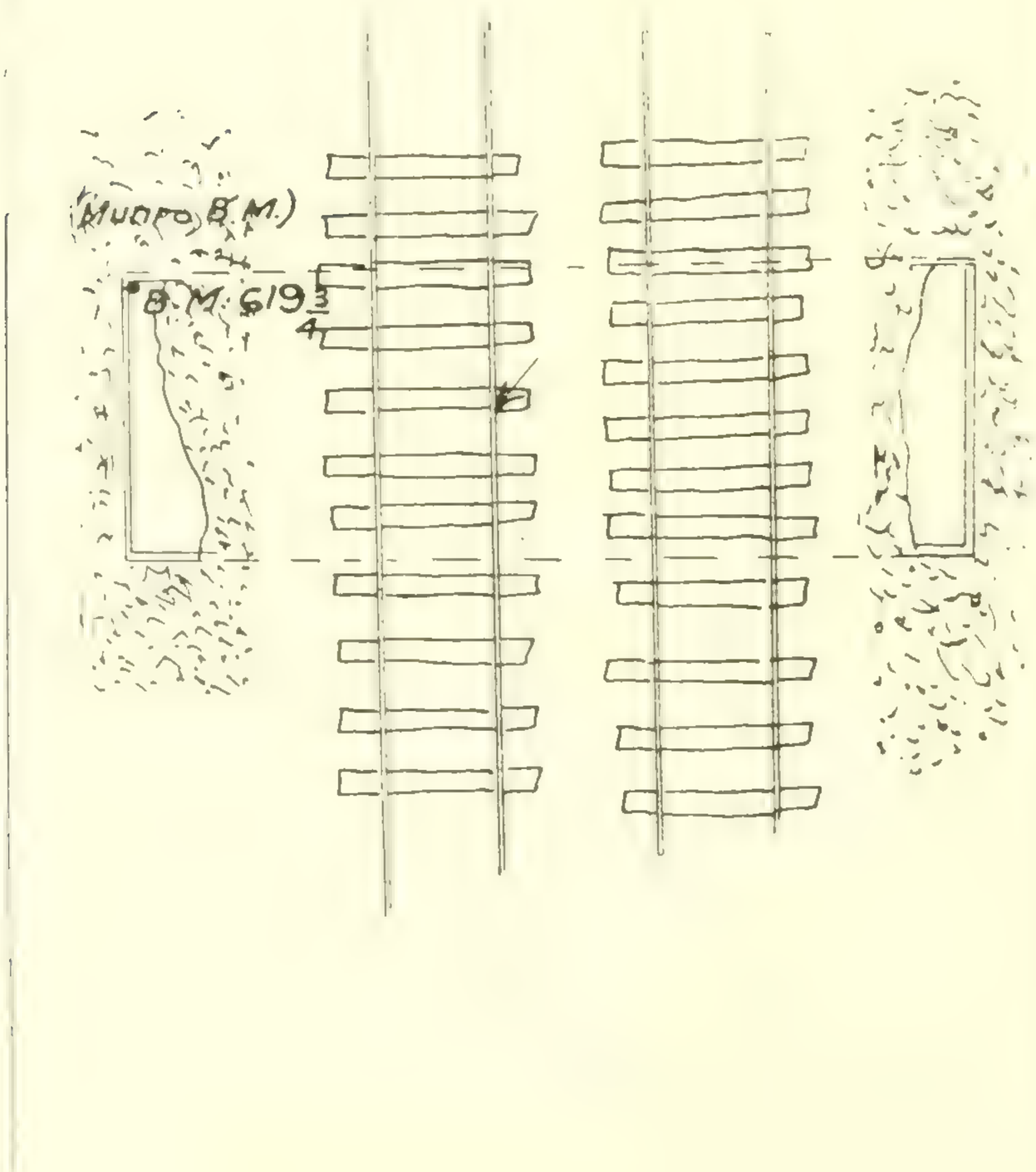
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DLXX.	In 2nd course from top S. end of W. abutment of G.T.R. bridge over Black river.....	162·97	163·27

LANCASTER, ONT.



619¾	S.W. corner of coping S. end of G.T.R. culvert at mile 63.....	180·83	181·13

SUMMERSTOWN, ONT.

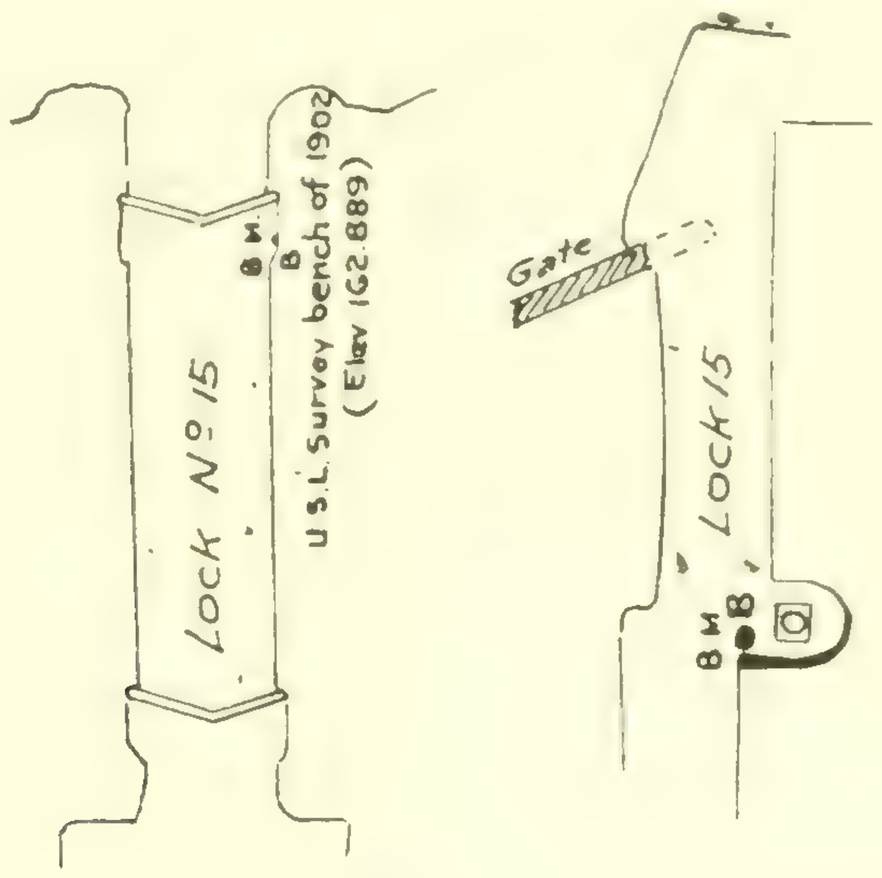


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

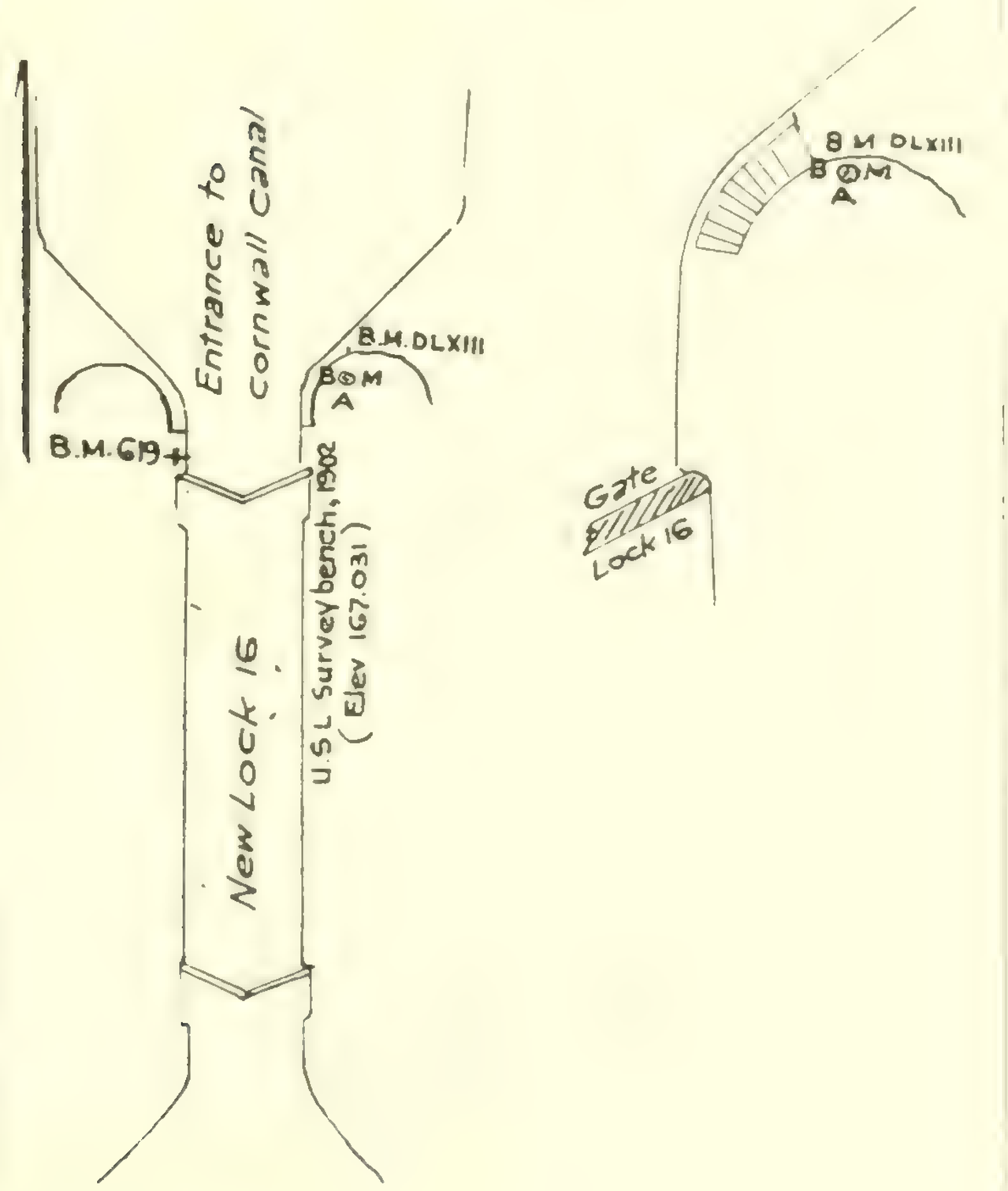
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
"B."	3 feet E. of W. edge of stone 4·4 ft, S. of N. face of S. wall of old lock 15, U.S.L.S.B.M. of 1902 (elevation 162.889).....	162·59	162·89

Cornwall, Ont.



"A."	+63 feet S. of front face of wall, 1·9 feet from rear edge of new entrance lock, U.S.L.S.B.M. of 1902 (elevation 167.031).....	166·73	167·03

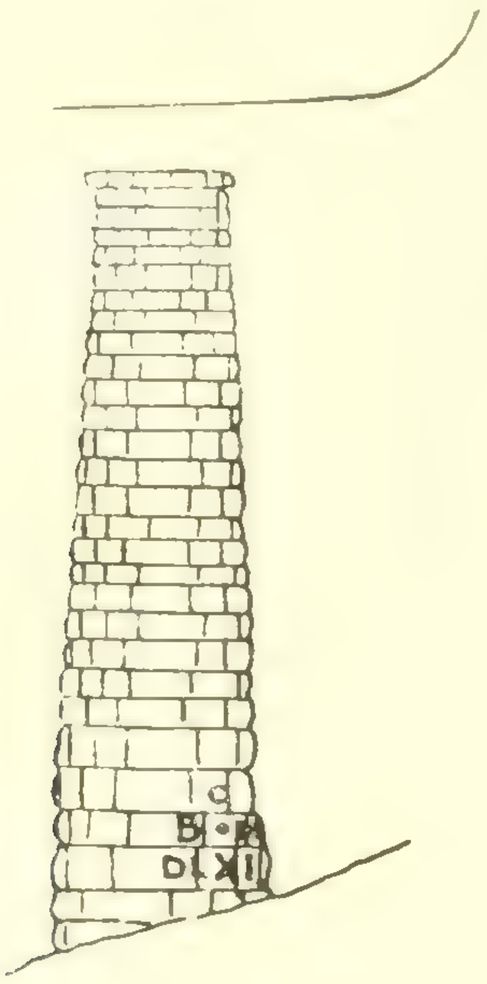
Cornwall, Ont.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	ELEATIONS. Instrumental.	Adjusted.
DLXI.	In N.E. corner, 3rd course from base, N. shore pier of N. Y. and O. Railway bridge over St. Lawrence river.....	165·36	165·66

CORNWALL, ONT.



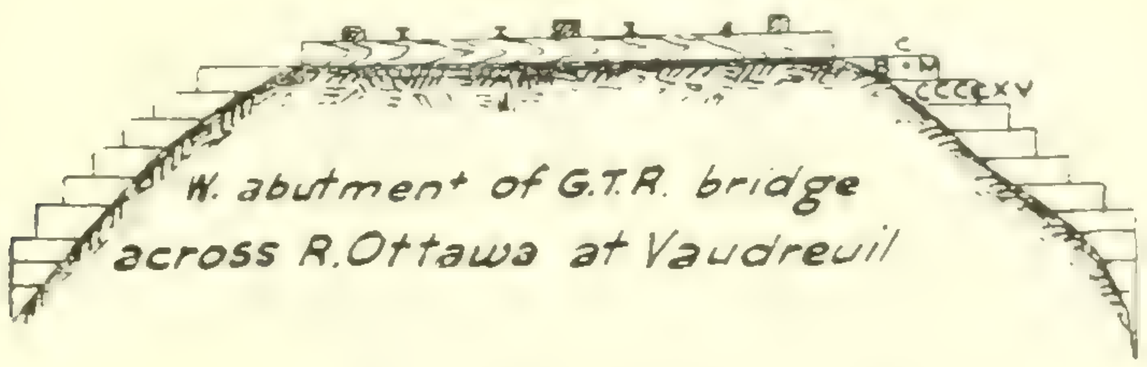
VAUDREUIL TO NORTH BAY.

DESCRIPTIVE LIST OF MOST IMPORTANT PERMANENT BENCH MARKS.

Datum: Mean Sea Level, Atlantic Ocean at New York.

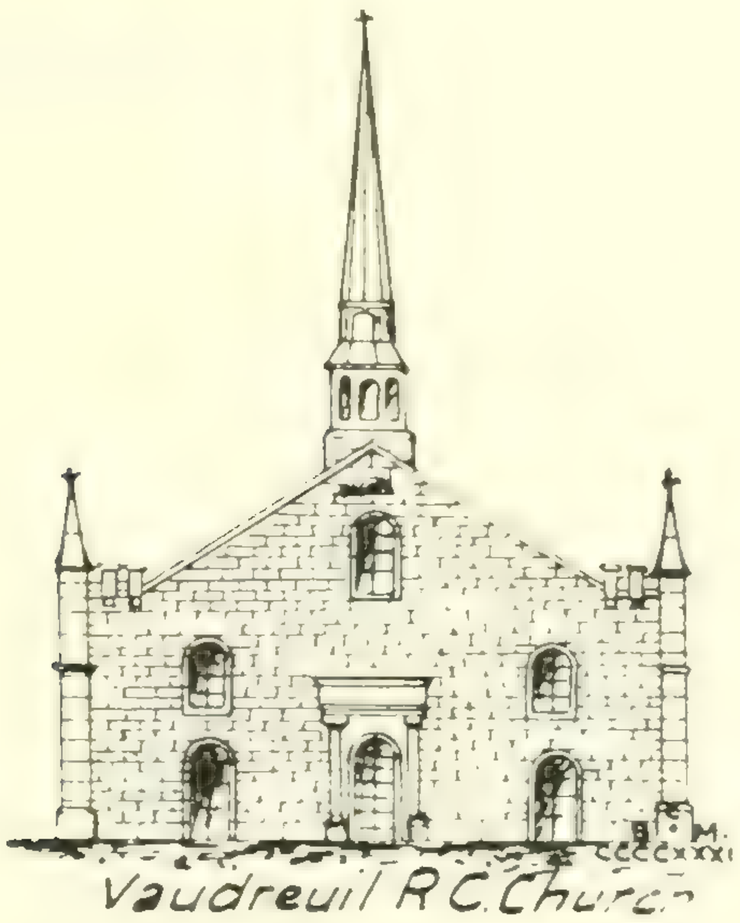
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXV.	Chisel line in end of copper plug, driven horizontally into west face, south of track of west abutment of G. T. R. bridge over Ottawa river	88.49	88.30	88.61

VAUDREUIL.



CCCCXXXI	Chisel line in end of copper plug, driven horizontally into east face of base of turret on south east corner of R. C. church..	86.74	86.55	86.89

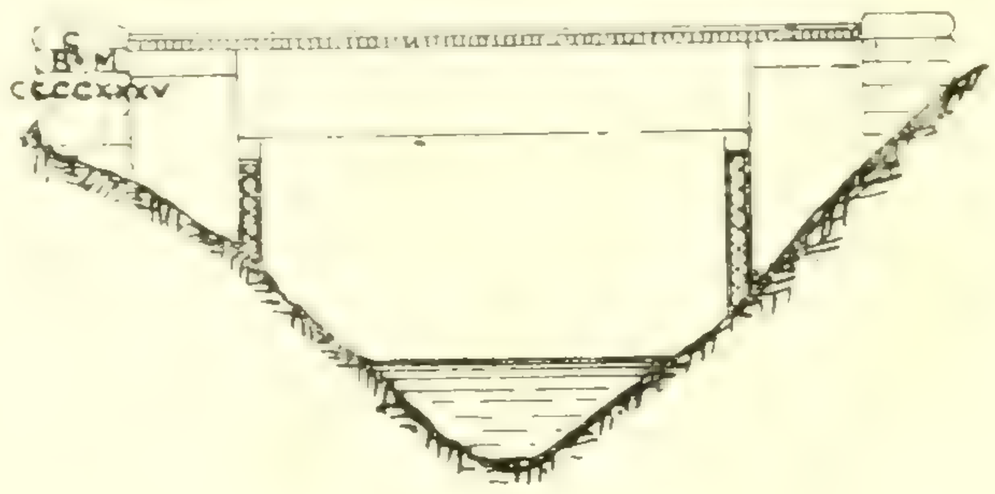
VAUDREUIL.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

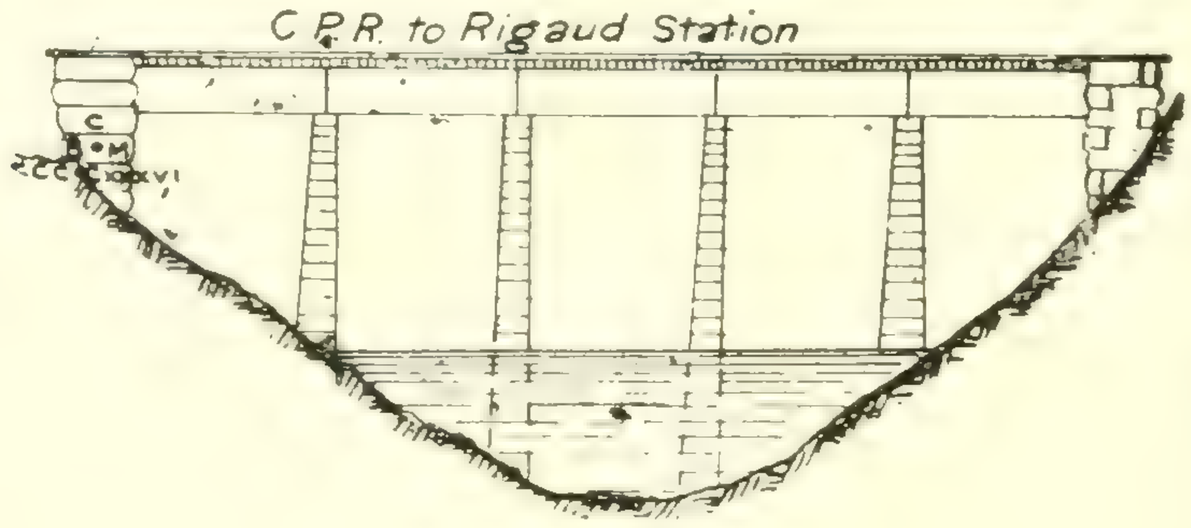
Bench Marks.	Description and Location.	Elevations. Based on Lacoine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXXXV	Chisel line in end of copper plug, driven horizontally into south side of west abutment of C.P.R. bridge over Raquette river, parish of Rigaud.....	98.72	98.53	98.89

COUNTY OF VAUDREUIL.



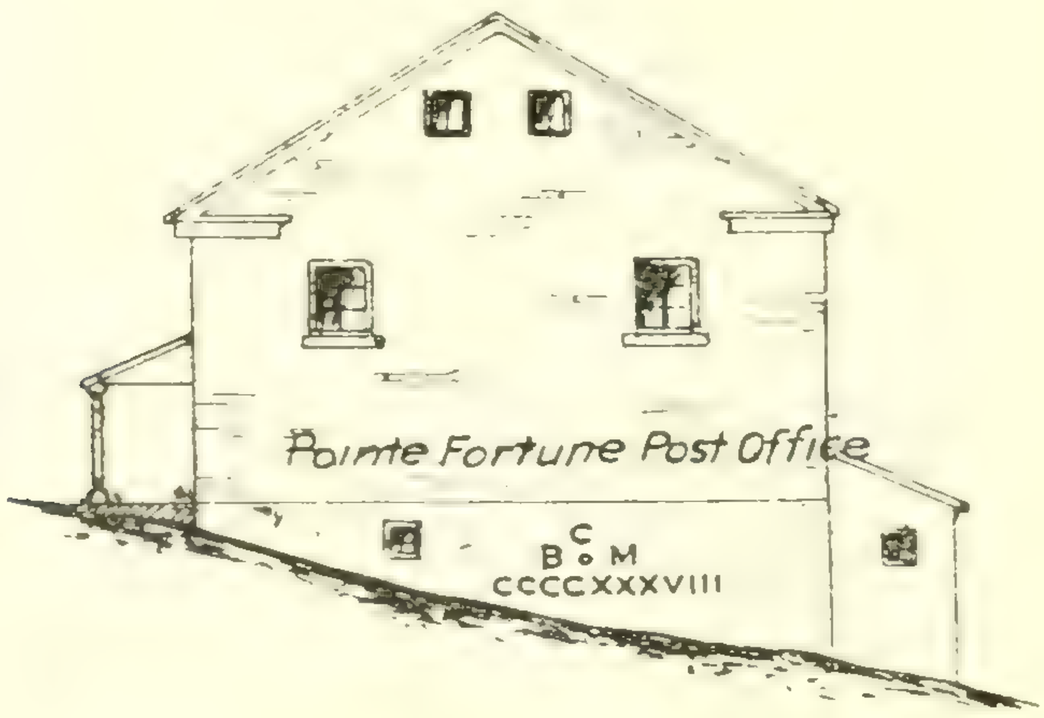
CCCCXXXVI	Chisel line in end of copper plug, driven horizontally into south face of west abutment of C.P.R. bridge over Riviere à la Graisse..	99.56	99.37	99.74

RIGAUD.



CCCCXXXVIII	Chisel line in end of copper plug, driven horizontally into stone foundation of wooden house, general store and post office, of Wm. Brown.....	83.92	83.73	84.13

POINTE FORTUNE.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.		
		Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted
CCCCXLI	Chisel line in end of copper plug, driven horizontally into stone foundation near east corner of north front of R. C. church...	191.73	191.54	191.9

St. Eugene.

CCCCLI	Chisel line in end of copper plug, driven horizontally into stone between two basement windows, west end of wing on west side of R. C. church.....	148.11	147.92	148 34

Hawkesbury.

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXLIX	Chisel line in end of copper plug, driven horizontally into north wall, stone foundation of F. N. Carriere's store and post office of McAlpins	223.47	223.28	223.69

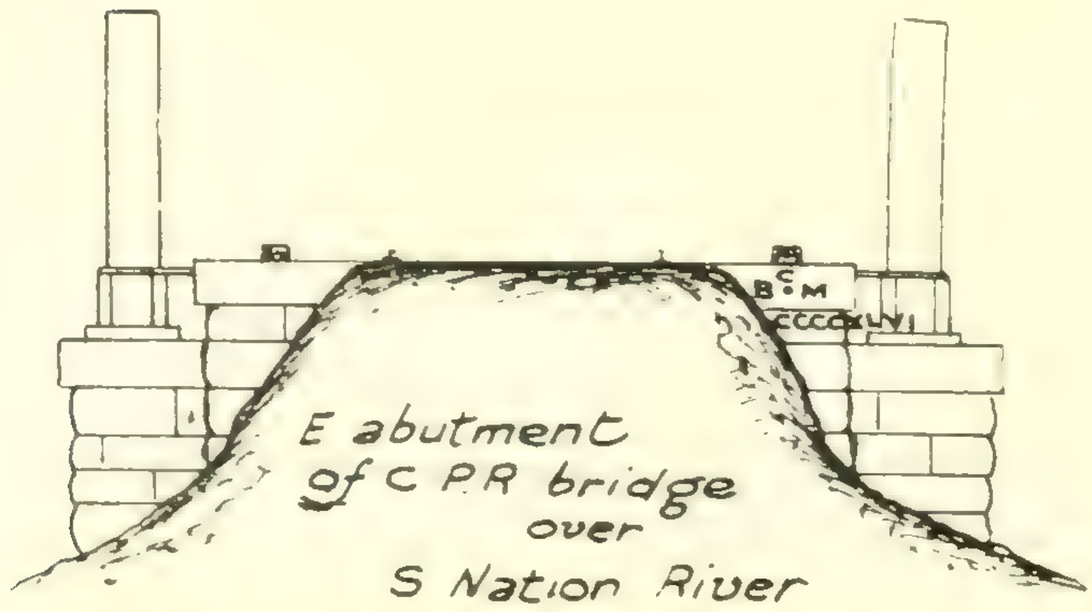
County of Prescott.

CCCCXLVII	Chisel line in end of copper plug, driven horizontally into north side of stone foundation of house owned by Grand Hotel Co	166.99	166.80	167.23

[Caledonia Springs.

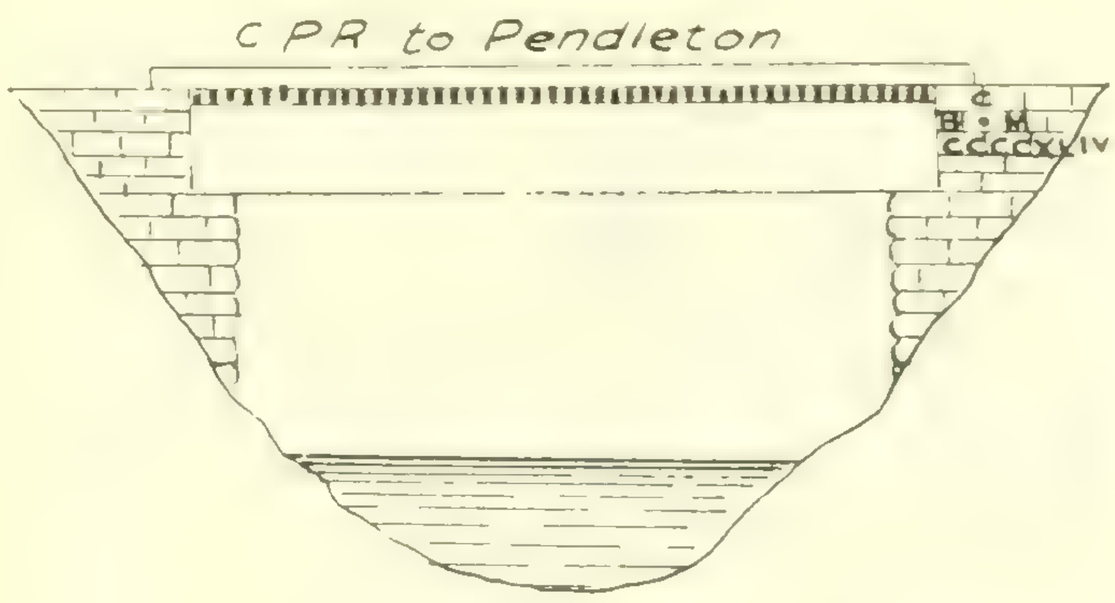
CCCCXLVI	Chisel line in end of copper plug, driven horizontally into coping stone in east end north of track, of north abutment of C.P.R. bridge over Nation river	168.78	168.59	169.05

Plantaganet.



SESSIONAL PAPER No. 19a

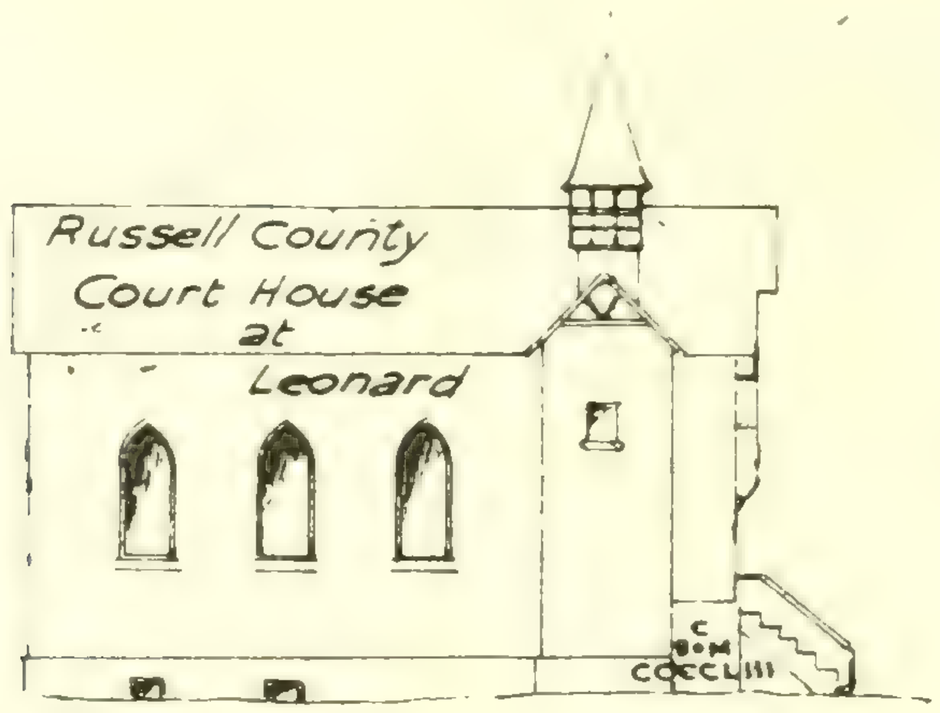
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXLIV	Chisel line in end of copper plug, driven horizontally into stone in second course from top, southeast side of northeast abutment of bridge (bearing mileage 57.1) over Dickensons brook....	192.51	192.32	192.78
	County of Prescott.			
				
CCCCXLIII	Chisel line in end of copper plug, driven horizontally into stone in north face of foundation under steeple, northwest corner of R. C. church.....	210.02	209.83	210.31
	The Brook.			
				

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

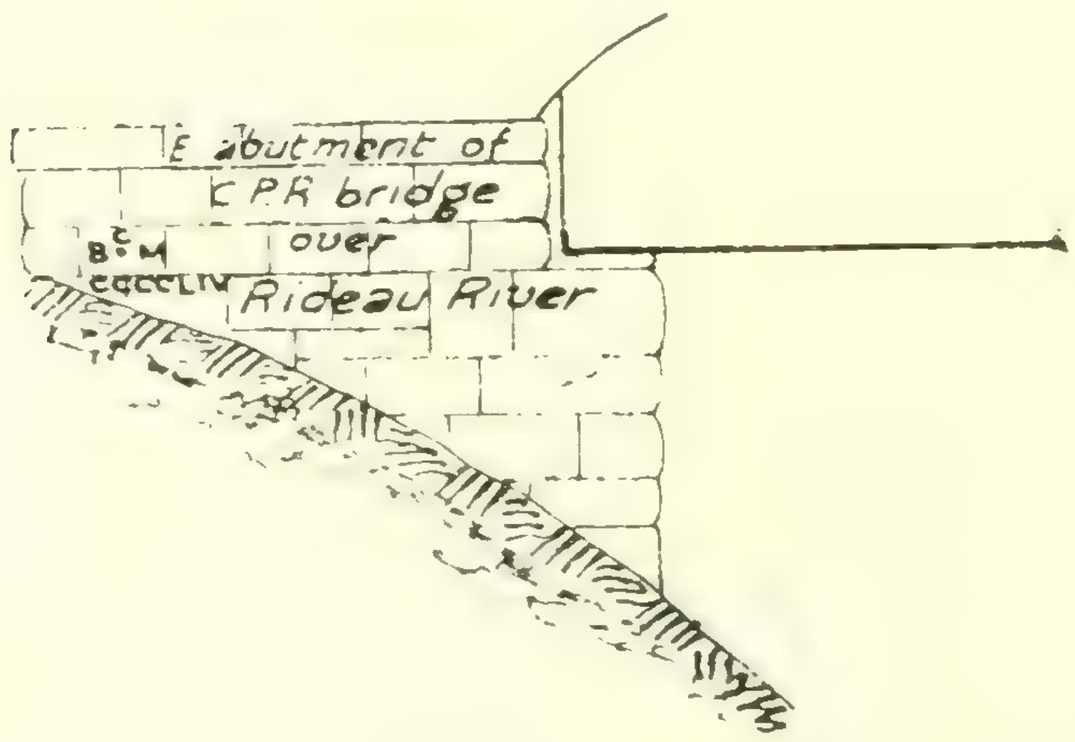
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCLIII	Chisel line in end of copper plug, driven horizontally into stone foundation in north side of projection or facade, on front or west end of small court house on east side of road, and second building south of C.P.R. track, at	271.57	271.38	271.87

LEONARD.



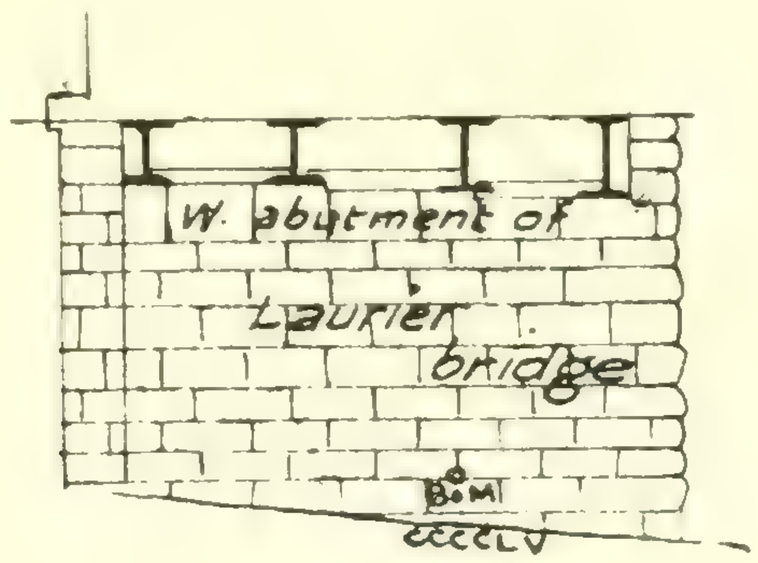
CCCCLIV	Chisel line in end of copper plug, driven horizontally into stone in third course from top north face of east abutment of C.P.R. bridge (M. and O. line) over Rideau river	194.87	194.68	195.22

HURDMANS BRIDGE.

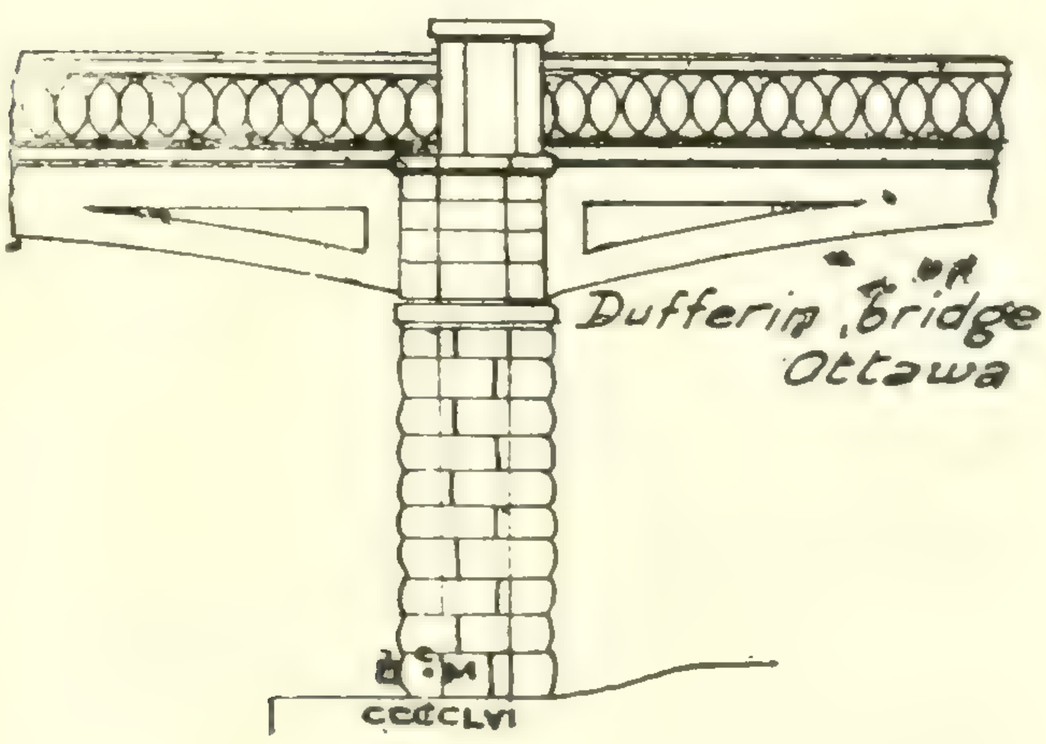


Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCLV	Chisel line in end of copper plug, driven horizontally into stone, about one foot above ground in east or inner face of west abutment of Laurier bridge	217.38	217.19	217.72
	Ottawa.			



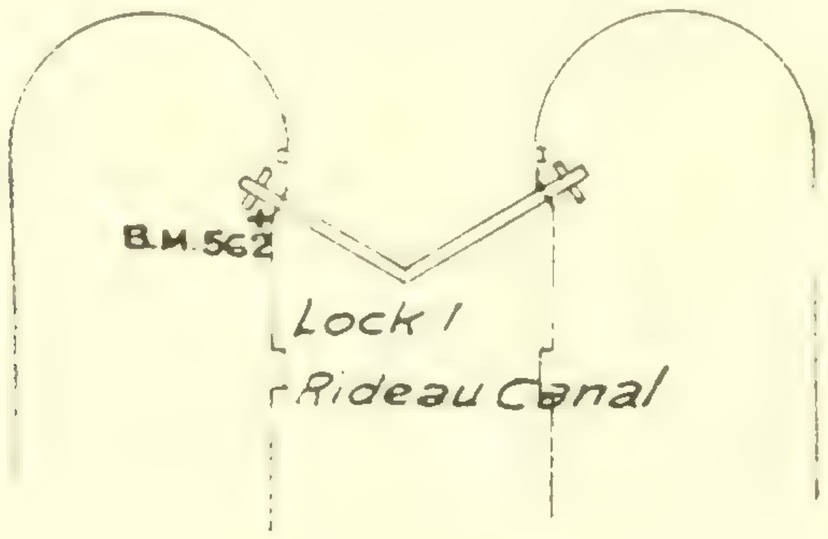
CCCCLVI	Chisel line in end of copper plug, driven horizontally into first stone above ground, north end of first pier west of Rideau canal, of Dufferin bridge, Wellington street	213.01	212.82	213.35
	Ottawa.			



Descriptive List of most Important Permanent Bench Marks—*Continued.*

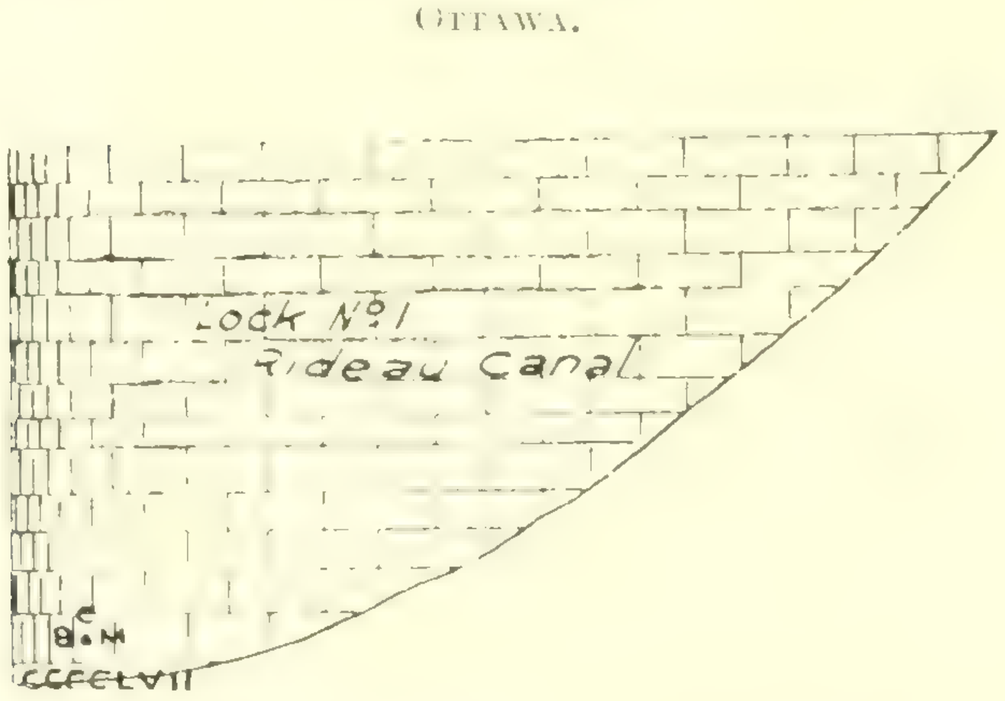
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
562	Cross cut in top of coping of west side, just north of lower gate of lock No. 1, Rideau canal.....	154.33	154.14	154.68

Ottawa.



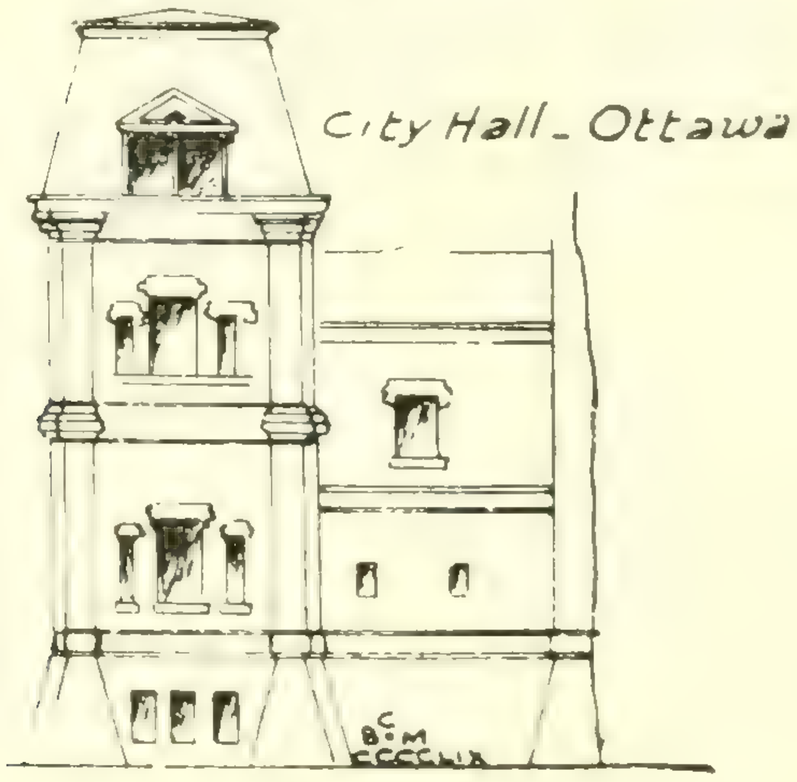
CCCCLVII	Chisel line in end of copper plug, driven horizontally into stone in thirteenth course from top, northwest face of curved wall, west side of entrance to lock No. 1, Rideau canal.....	135.37	135.18	133.72

Ottawa.

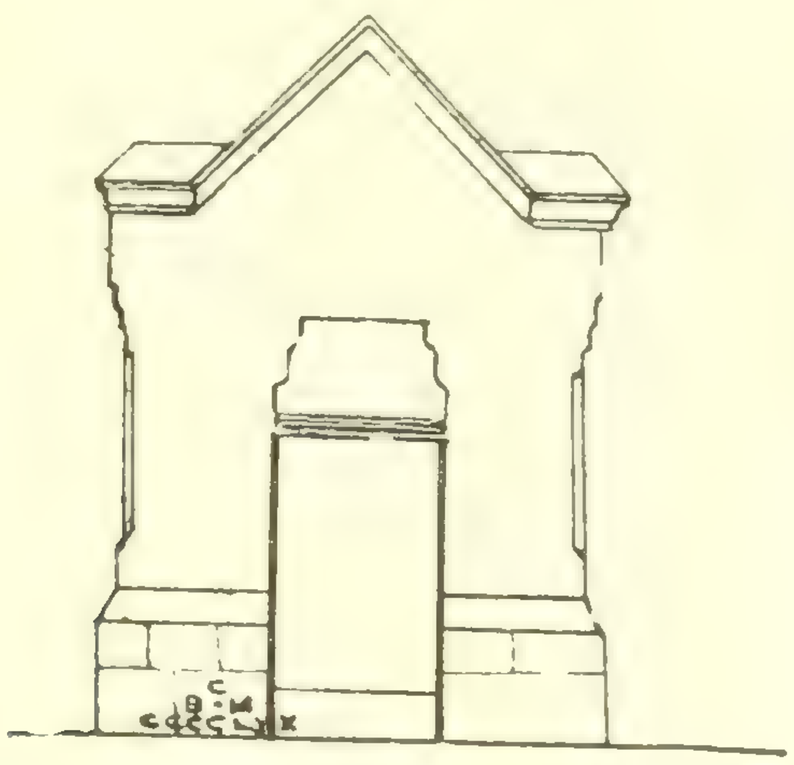


CCCCLIX	Chisel line in end of copper plug, driven horizontally into stone in south, or Albert street face, just behind south corner of turret on southwest corner of City Hall.....	240.55	240.36	240.89

Ottawa.



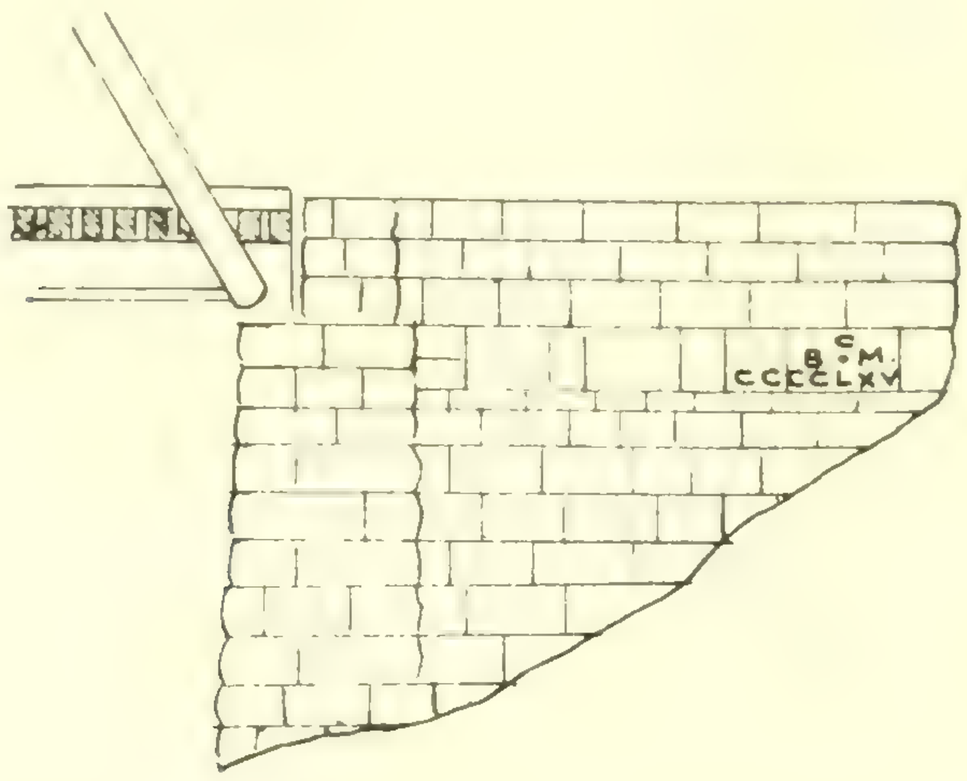
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCLXX	Chisel line in end of copper plug, driven horizontally into dressed stone in east face of portico, just south of door, rear entrance of Hull R. C. church, corner of Victoria street and Laurier avenue.	177.90	177.71	178.25
	Hull.			
				
CCCCLXVI	Chisel line in end of copper plug, driven horizontally into stone foundation, front, or Broad street face, of second class waiting room of Union station (C.P.R.).	184.72	184.53	185.06
	Ottawa.			

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

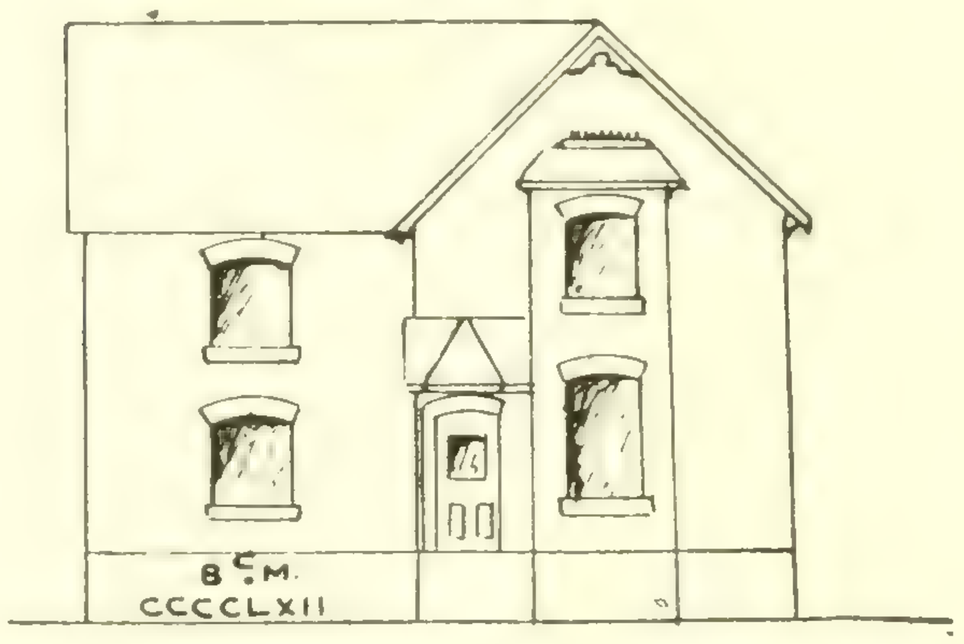
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted
CCCCLXV	Chisel line in end of copper plug, driven horizontally into stone in third course from top, upper or west face of south abutment of Prince of Wales (C.P.R.) bridge, Chaudiere.....	185.54	185.35	185.89

OTTAWA.



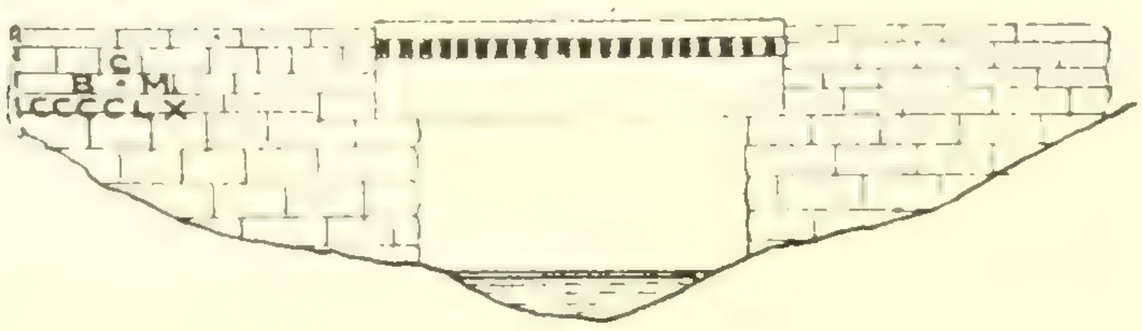
CCCCLXII	Chisel line in end of copper plug, driven horizontally into stone foundation of east or front wall of south wing of house of John Whitton, second house north of C.P.R. track, west side of cross road at village of.....	203.38	203.19	203.74

BRITANNIA.



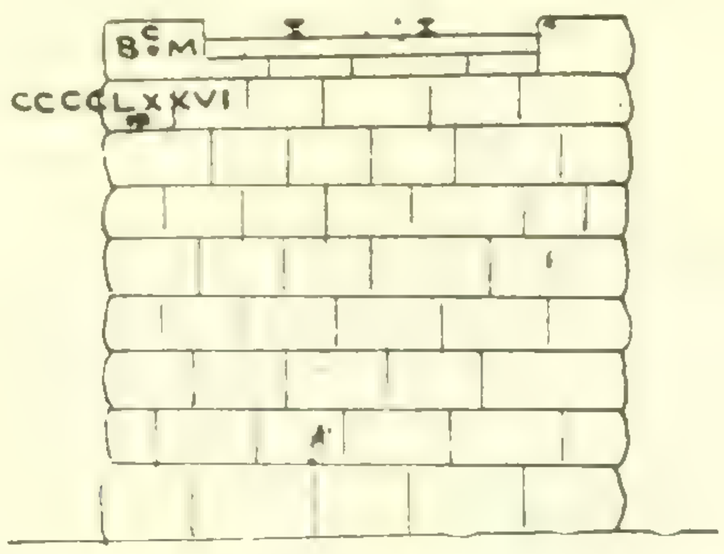
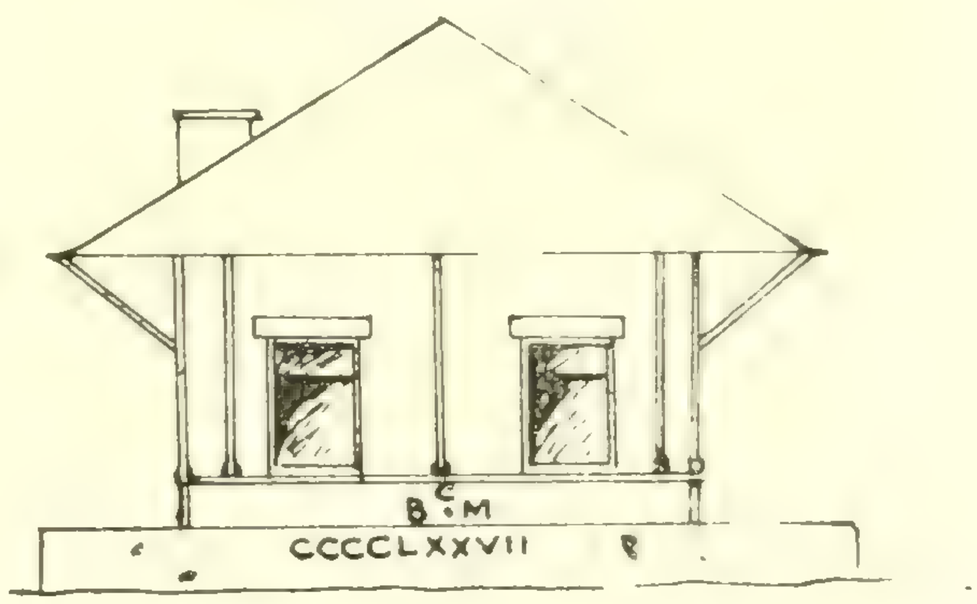
CCCCLX.	Chisel line in end of copper plug, driven horizontally into stone in 4th course from top, N.E. face of S.E. abutment of Grand Trunk Railway bridge over Carp river, Huntley, and W. of town of	307·54	307·35	307·93

CARP.



SESSIONAL PAPER No. 19a

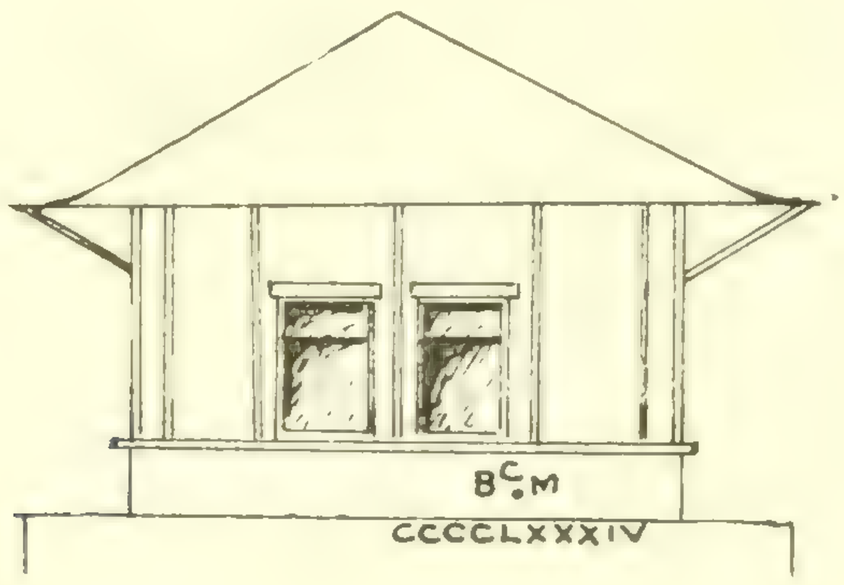
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.		
		Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCLXXVI.	Chisel line in end of copper plug, driven horizontally into S.E. face of coping stone on S. corner of N.W. abutment of G.T.R. bridge over Mississippi river.....	290·32	290·13	290·73
	Galetta.			
				
CCCCLXXVII.	Chisel line in end of copper plug, driven horizontally into stone in centre of N. end of C.P.R. station of.....	300·74	300·55	301·17
	Arnprior.			
				
CCCCLXXXVII	Chisel line in end of copper plug, driven horizontally into stone foundation of front or N.E. face of brick schoolhouse.....	267·26	267·07	267·1
	Sand Point.			
				

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

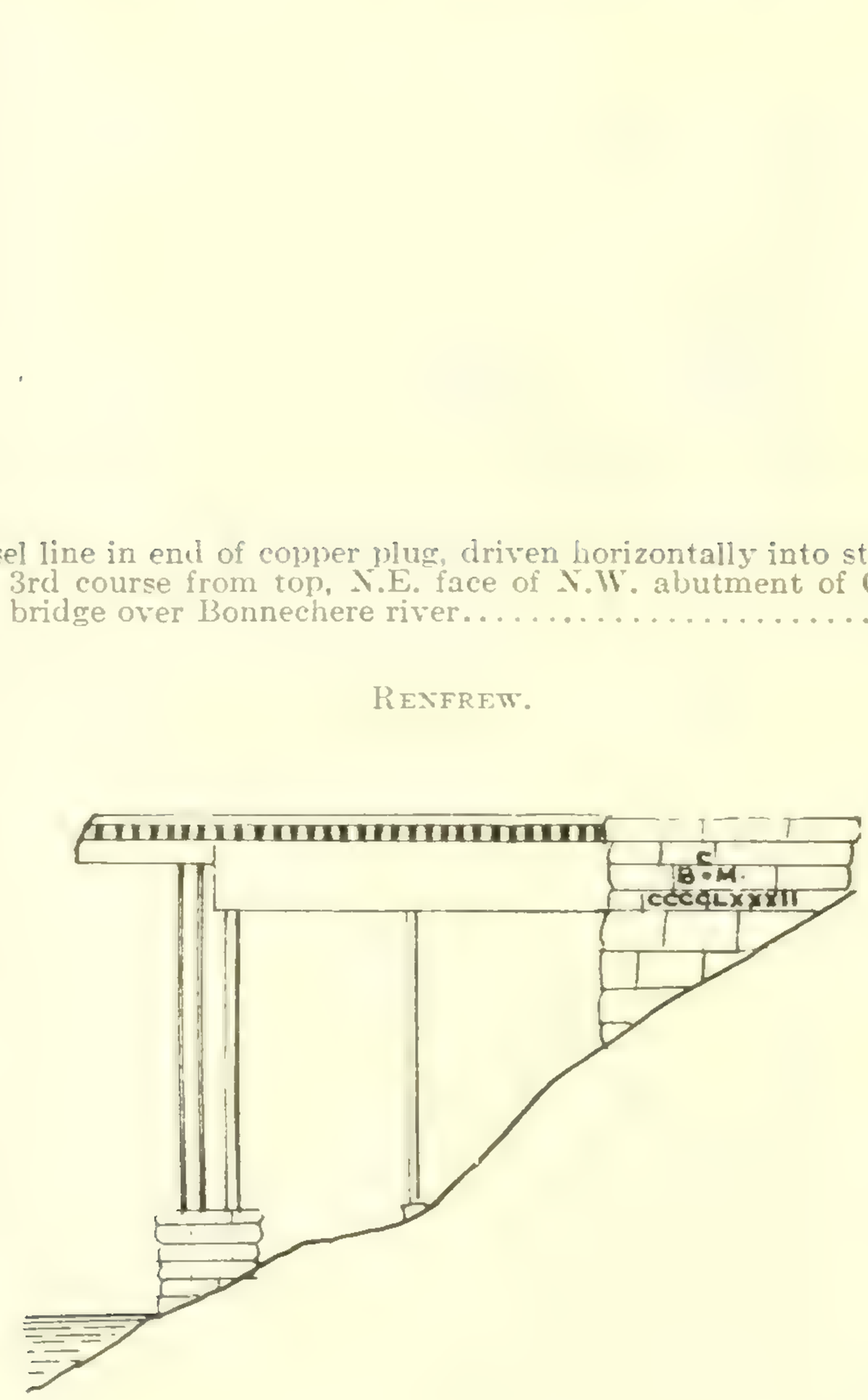
Bench Marks.	Description and Location.	Elevations.		
		Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCLXXXIV.	Chisel line in end of copper plug, driven horizontally into stone in E. end of railway station.....	418·01	417·82	418·48

RENFREW.



CCCCLXXXII.	Chisel line in end of copper plug, driven horizontally into stone in 3rd course from top, N.E. face of N.W. abutment of C.P.R. bridge over Bonnechere river.....	385·53	385·34	386·00

RENFREW.

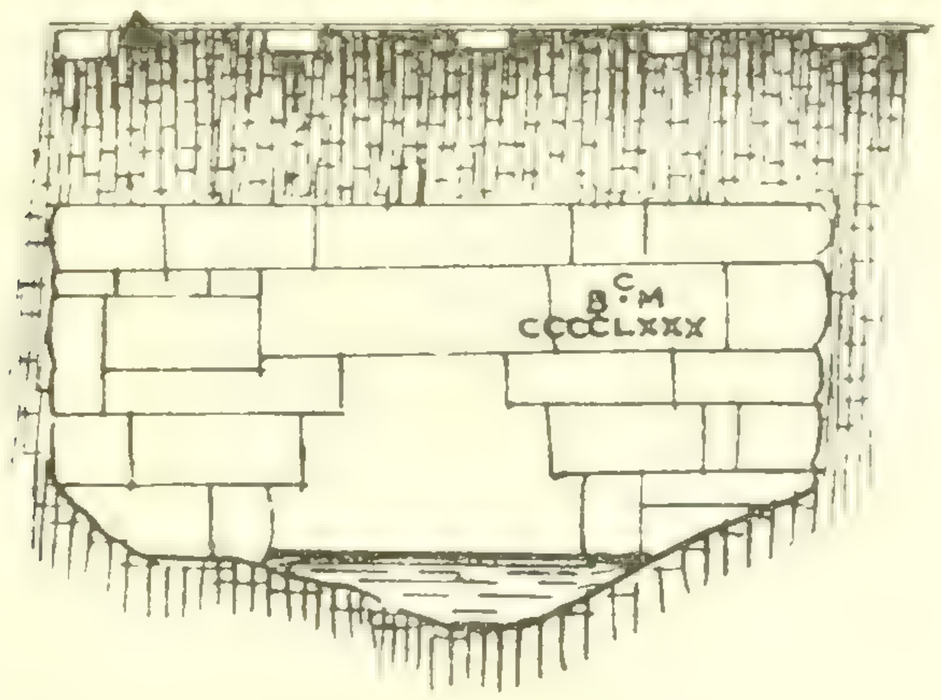


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

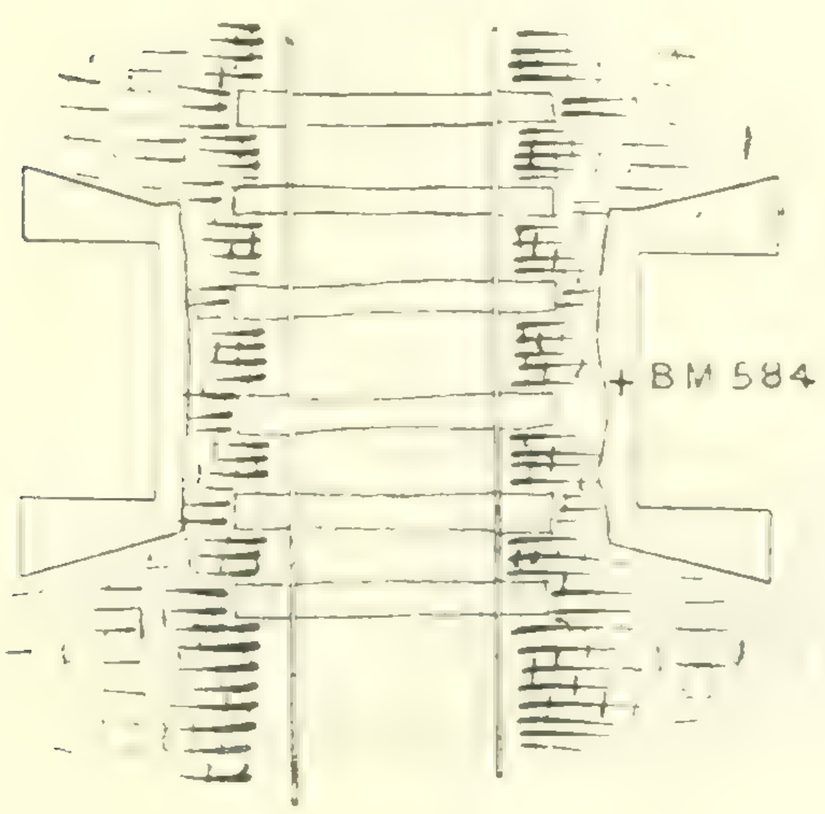
Bench Marks.	Description and Location.	Elevations		
		Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted
CCCCLXXX.	Chisel line in end of copper plug driven horizontally into stone in 2nd course from top, N.E. end of large covered stone culvert under C.P.R. (mileage 801), and on lot 19, con. II, township of Ross.....	509·69	509·50	510·19

COUNTY OF RENFREW.



584	Cross cut in top, at centre of W. end of little concrete culvert under C.P.R., about 1,140 feet S. of mile post 93 and opposite Mrs. Crawford's property lot 14, con. II, township of Westmeath	444·49	444·30	445·01

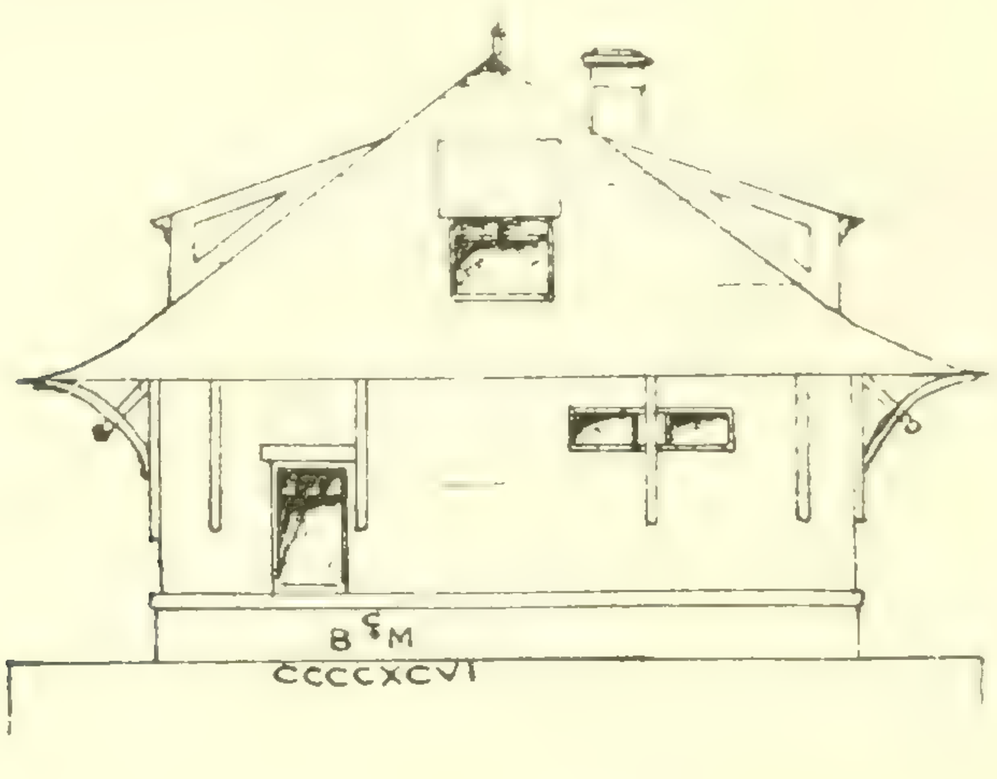
COUNTY OF RENFREW.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

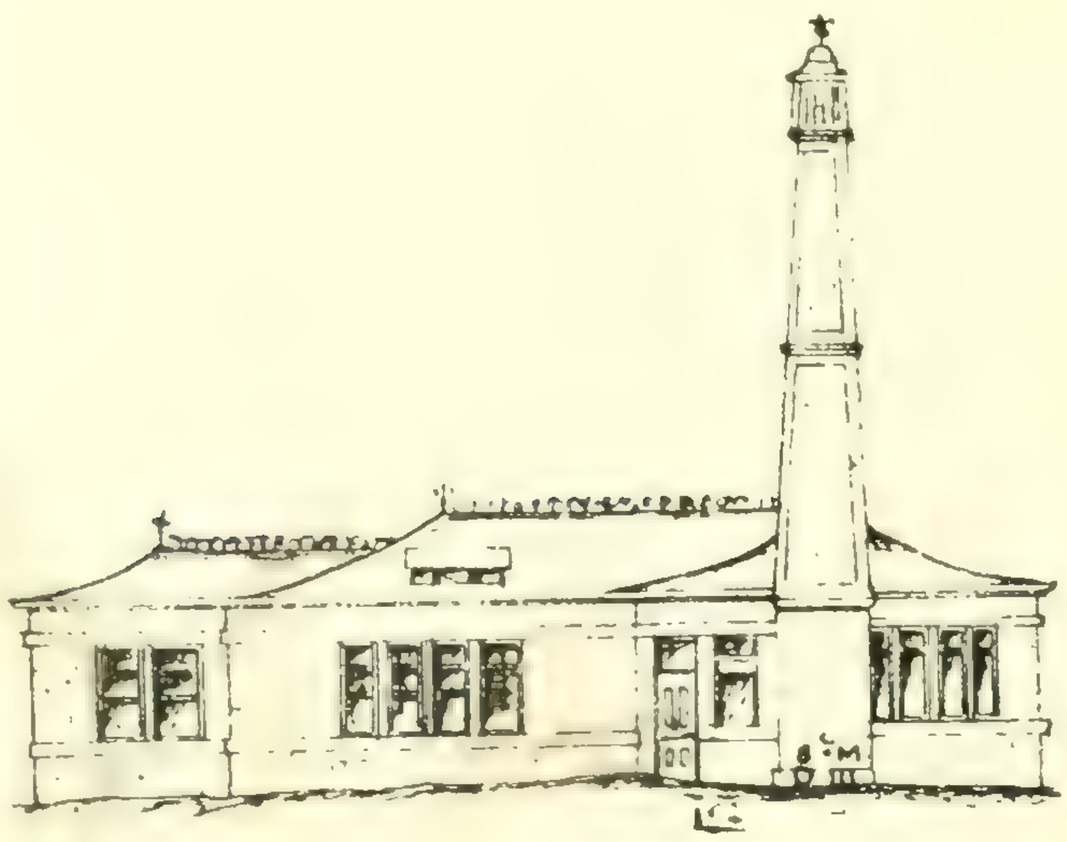
Bench Mark	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXCVI.	Chisel line in end of copper plug, driven horizontally into stone in W. end of C.P.R. station at..	382·48	382·29	383·04

PEMBROKE.



DIII.	Chisel line in end of copper plug, driven horizontally into stone in E. face of foundation of large chimney of Pembroke water works.	377·64	377·45	37[illegible]·19

PEMBROKE.

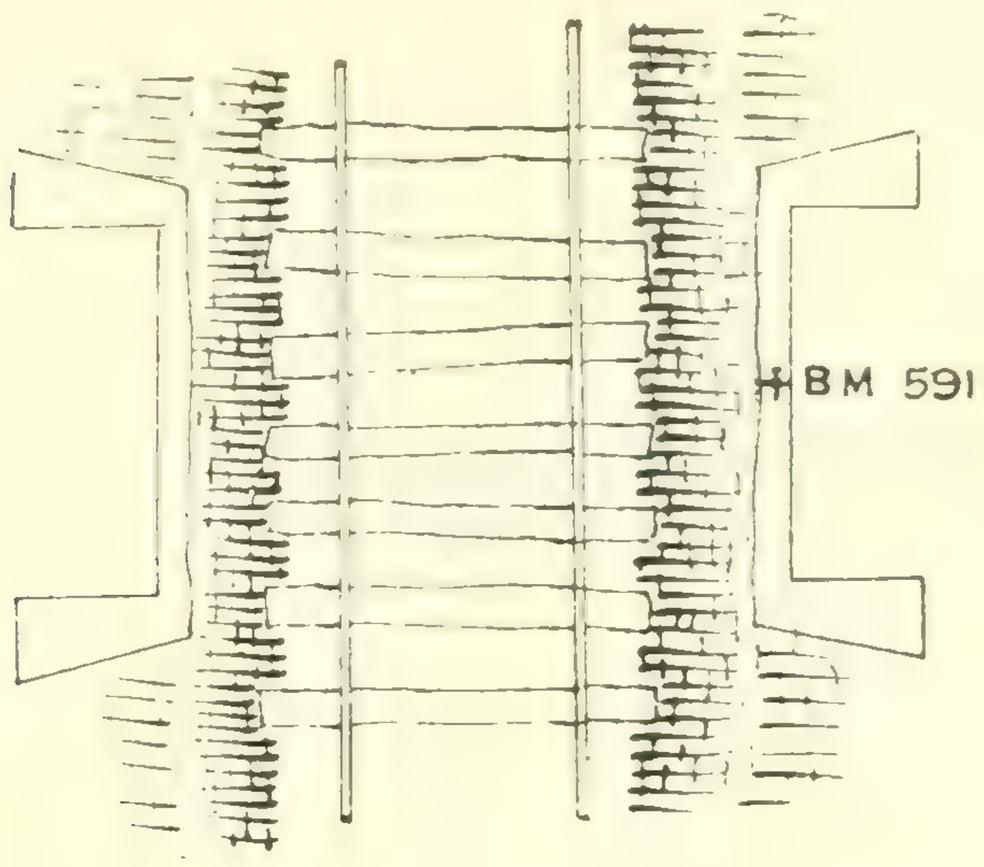


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

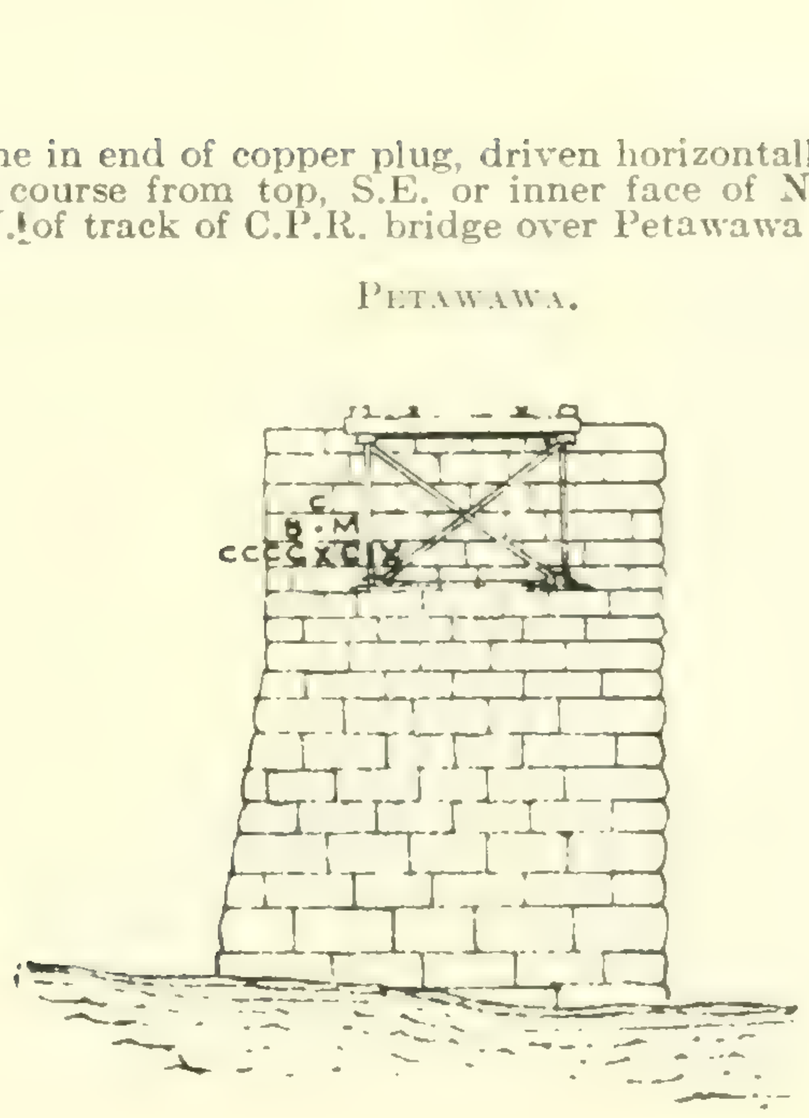
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
591	Cross cut in top at centre of N.E. end of covered concrete culvert under C.P.R., 225 feet N.W. of station and just S.E. of road to Ottawa river and village of.	463·55	463·36	464·12

Petawawa.



CCCCXCIX.	Chisel line in end of copper plug, driven horizontally into stone in 4th course from top, S.E. or inner face of N.W. abutment, S.W. of track of C.P.R. bridge over Petawawa river.....	455·72	455·52	456·29

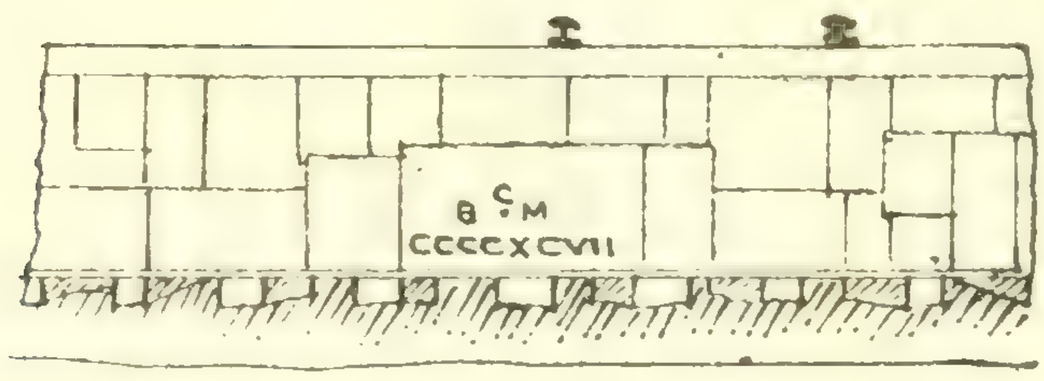
Petawawa.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

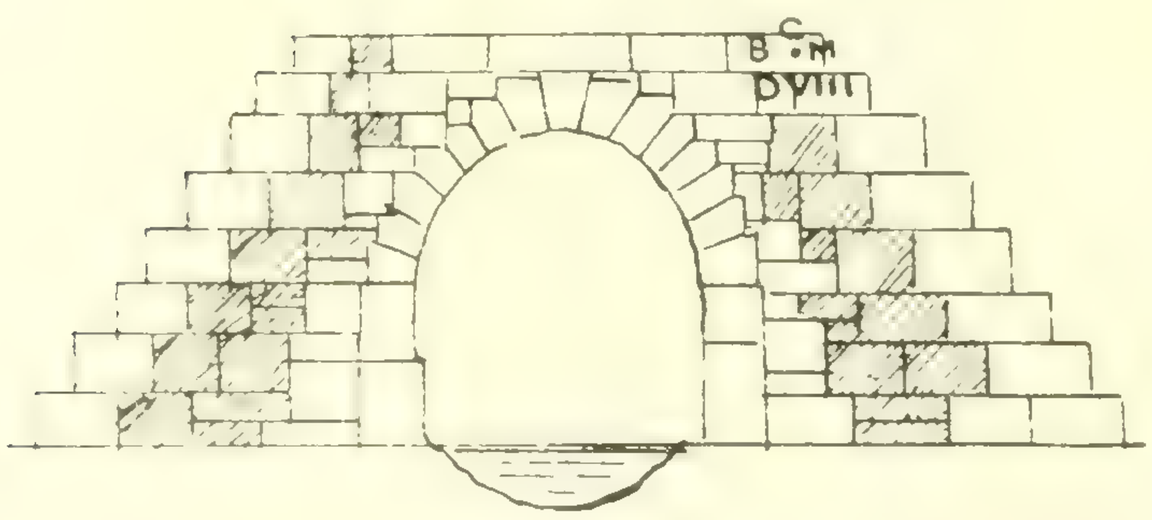
Bench Mark.	Description and Location.	Elevations.		
		Based on Lachine B.M. 94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
CCCCXCVII.	Chisel line in end of copper plug, driven horizontally into stone looking N. and inward at S. side of C. P. R. locomotive turntable at	521·64	521·45	522·23

Chalk River



DVIII	Chisel line in end of copper plug, driven horizontally into end of top altar step on S. corner of large arched stone culvert under C.P.R., 19·06 miles from Chalk River and on lot 9, con. VI, township of Head..	568·82	568·63	569·4

Nipissing District.

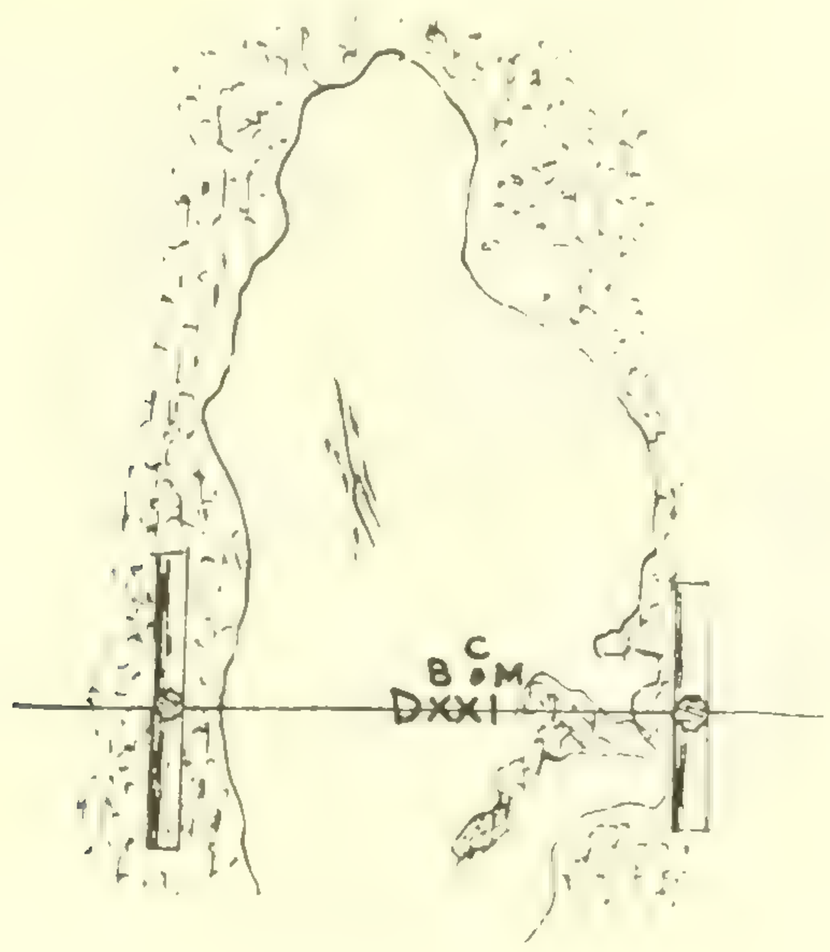


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

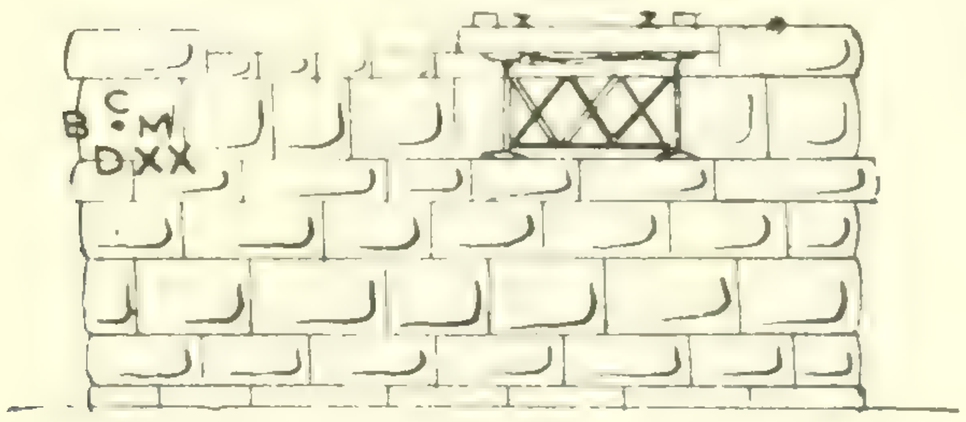
ench Marks.	Description and Location.	Elevations. Based on Lachine B.M. =94·10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
DXXI.	Top of copper plug, driven vertically into flat bed rock on C.P.R. right of way, just beside N. fence, 40 eet N. of track and 100 feet N. of railway station..	474·36	474·17	475·02

ROCKLIFFE.



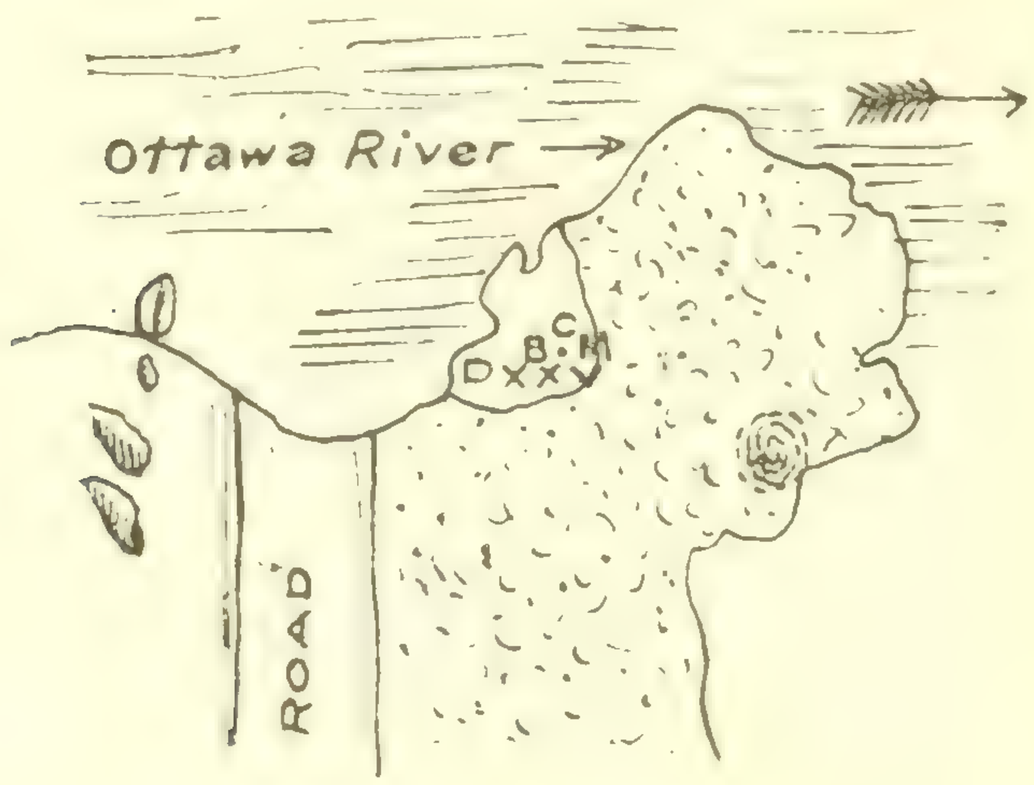
DXX.	Chisel line in end of copper plug, driven horizontally into E. face of stone on S end of 2nd course from top, E. or inner face of W. abutment of C.P.R. bridge over Grant's brook (mileage, 29·89 from Chalk River), and on lot 31. Mattawa road lots of Head.....	464·58	464·39	465·25

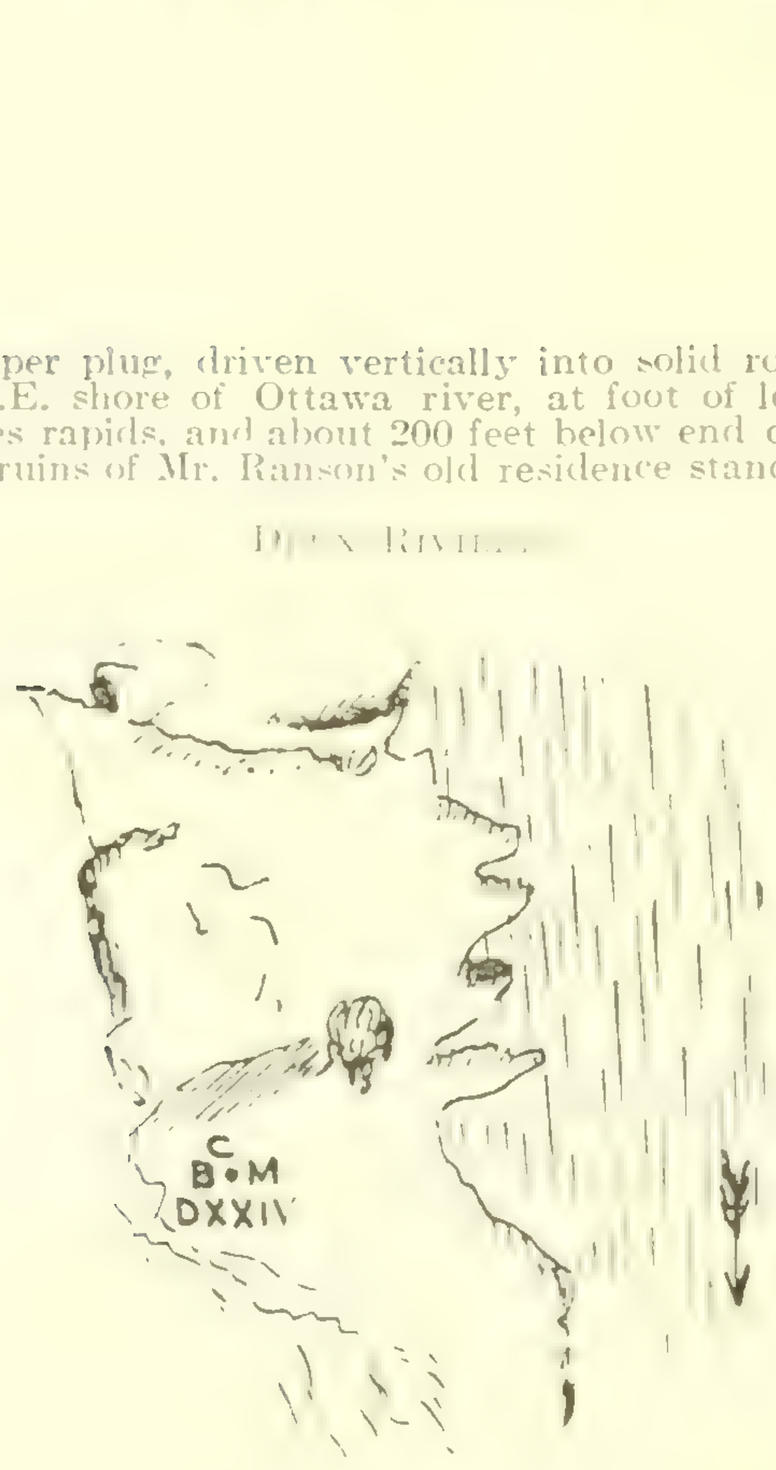
NIPISSING DISTRICT.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.		
		Based on Lachine B.M. +94,10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
DXXV.	Top of copper plug, driven vertically into top at W. side of small rock projection or peninsula on S. shore of Ottawa river, at foot of road leading from government road to Ottawa river, 1 mile W. of mouth of Bissett river, and above head of Rocher Capitaine rapids.....	450·83	450·64	451·51
	Vipissing District.			
DXXIV.	Top of copper plug, driven vertically into solid rock at foot of cliff, S.E. shore of Ottawa river, at foot of lower or Deux Rivieres rapids, and about 200 feet below end of little point, where ruins of Mr. Ranson's old residence stands.....	454·63	454·44	455·35
	Deux Rivieres.			



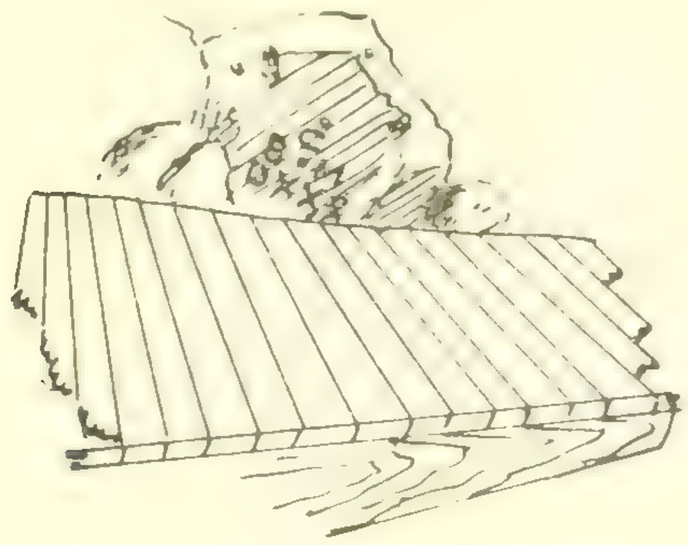


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.		
		Based on Lac[illegible] B.M. +94.10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
DXXX	Chisel line in end of copper plug, driven horizontally into N. side of boulder just S. of station platform, about 26 feet from W. end C.P.R. station	531·63	531·44	532·36

Klock.

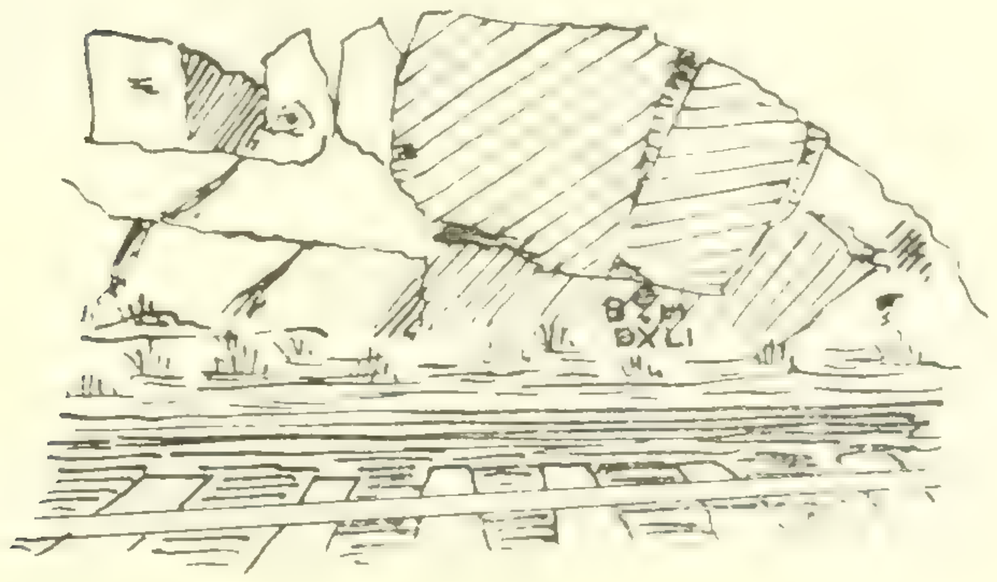


DXXXVI.	Chisel line in end of copper plug, driven horizontally into S. side of boulder bearing Messrs. Cross and Bell's B.M., on S. shore Ottawa river, at foot of cleared survey line from railway to river, 1 mile E. of C.P.R. station of	500·72	500·53	501·47

Ottawa.

DXLI	Chisel line in end of copper plug, driven horizontally into solid rock in cut 15 feet N.E. of track and 600 feet S.E. of mile post 80 from Chalk River	629·22	629·03	630·00

Nipissing District.

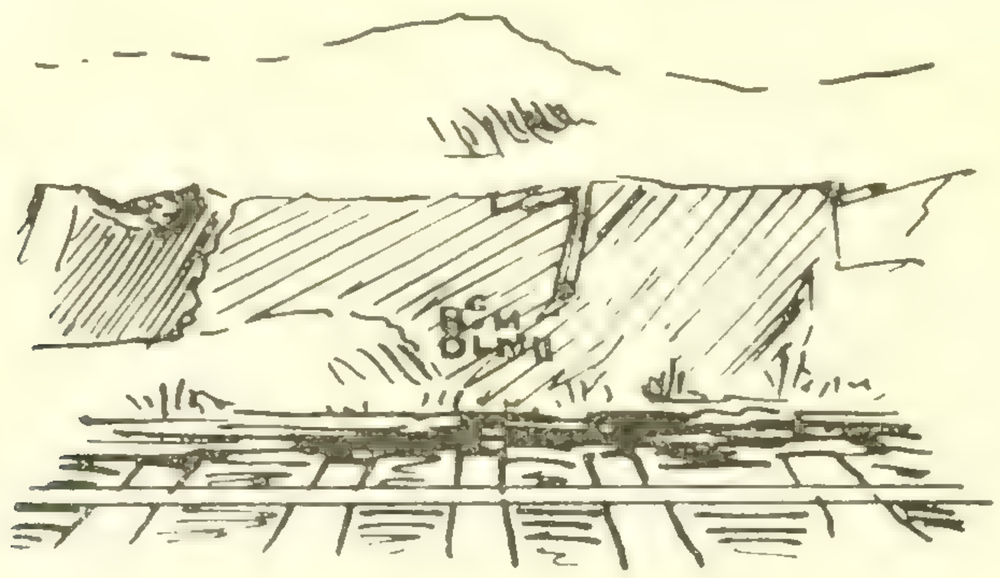


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

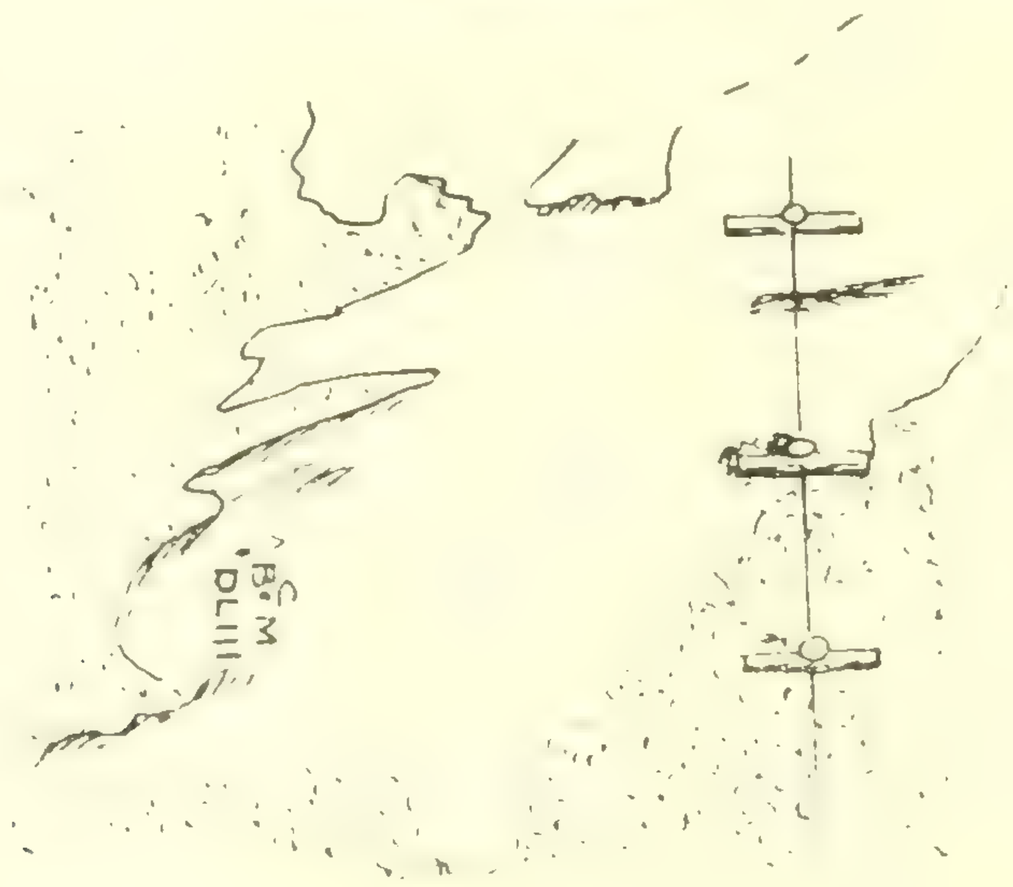
Bench Marks.	Description and Location.	Elevations. Based on Lachine B.M. +94,10 (As used on Survey).	Instrumental (Via St. Lambert to Vaudreuil).	Adjusted.
DLVII.	Chisel line in end of copper plug, driven horizontally into shallow rock cut 12 feet N. of track and 1,930 feet W. of mile post 90 from Chalk River, at Mr. Wm. Hill's property, E. of.....	756·84	756·65	757·64

Rutherglen.



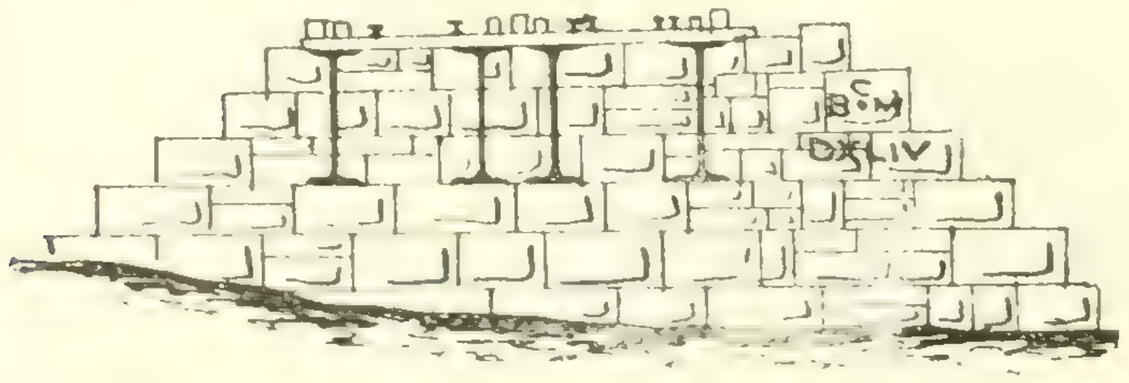
DLIII.	Top of copper plug, driven vertically into flat exposed bed rock, 30 feet N. of track and 745 feet E. of mile post 100 from Chalk River and N. of	782·63	782·44	783·45

Lake Nasbonsing.



DXLIV.	Chisel line in end of copper plug, driven horizontally into 2nd course from top northwest face, at west end of southeast abutment of C.P.R. bridge over Chippewa creek, southeast of.....	649·86	649·66	650·71

North Bay.



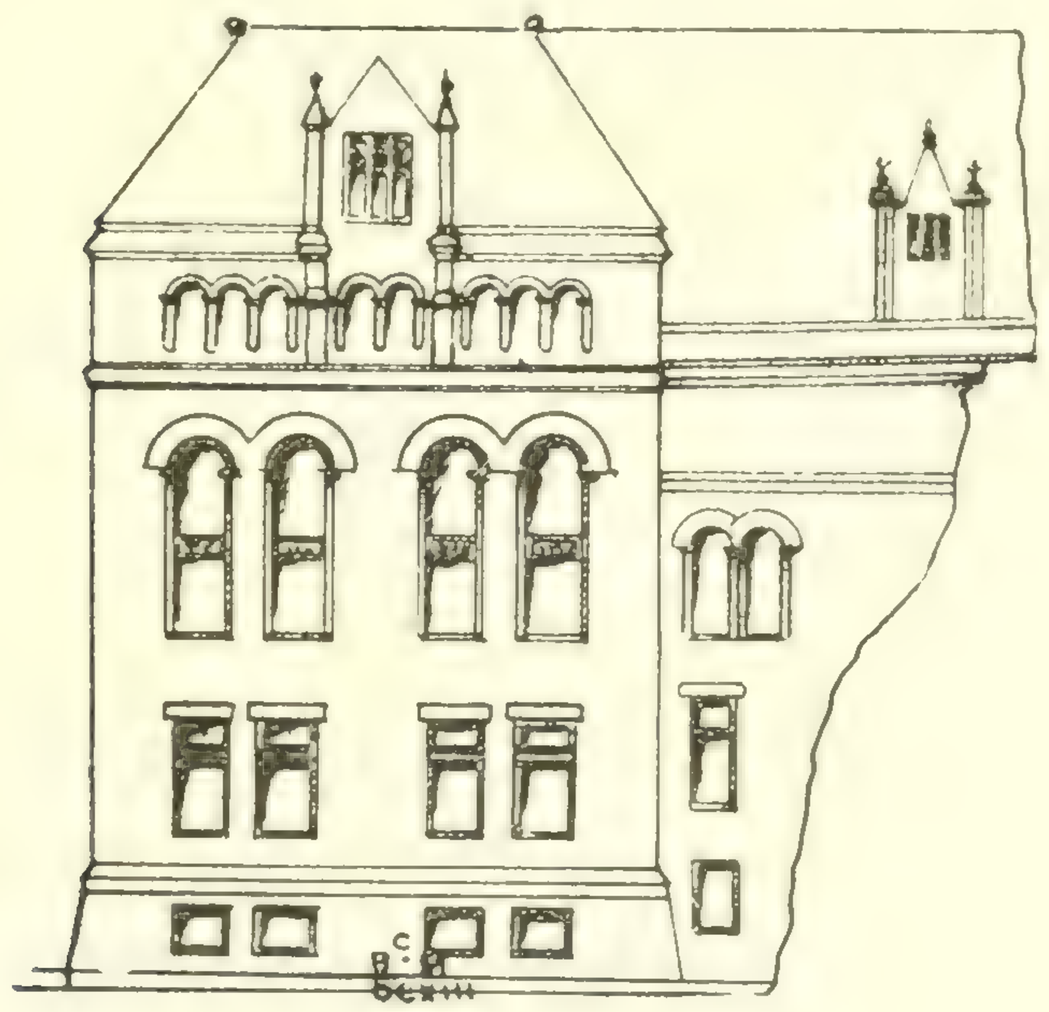
TORONTO TO NORTH BAY.

DESCRIPTIVE LIST OT MOST IMPORTANT PERMANENT BENCH MARKS.

Datum: Mean Sea Level, Atlantic Ocean, at New York.

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCXIII.	Chisel line in end of copper plug driven horizontally into stone in first course above ground in east, or James street side, and about 24 feet from south corner of City Hall	296·96	

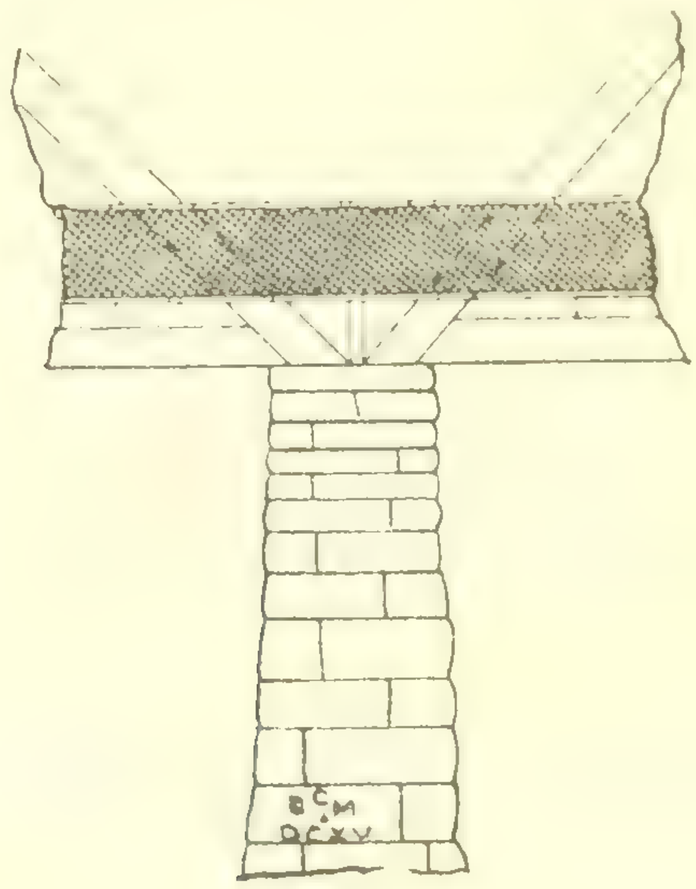
Toronto.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

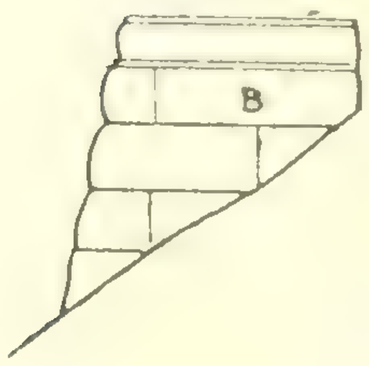
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCXV.	Chisel line in end of copper plug driven horizontally into stone in first course wholly above ground, in west face of fourth pier from north abutment of bridge over railway tracks, at foot of John street.....	254·33	

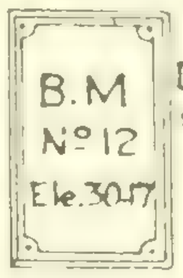
TORONTO.



No. 12. Ele. 30·17.	City Engineer's bench mark, protruding shelf on small iron plate screwed into stone in first course below coping, east face of north abutment of Bathurst street bridge.....	275·04	

TORONTO.





Detail of Iron plate showing bench

Zero.	Georgian Bay Ship Canal automatic water gauge register, in small cabin on north edge, about 30 feet from west end of Queen's Wharf.....	242·87	

TORONTO HARBOUR.

Zero.	Federal Public Works Department automatic water gauge register in shed about 60 ft. from west end of Queen's Wharf.	243·28	

TORONTO HARBOUR.

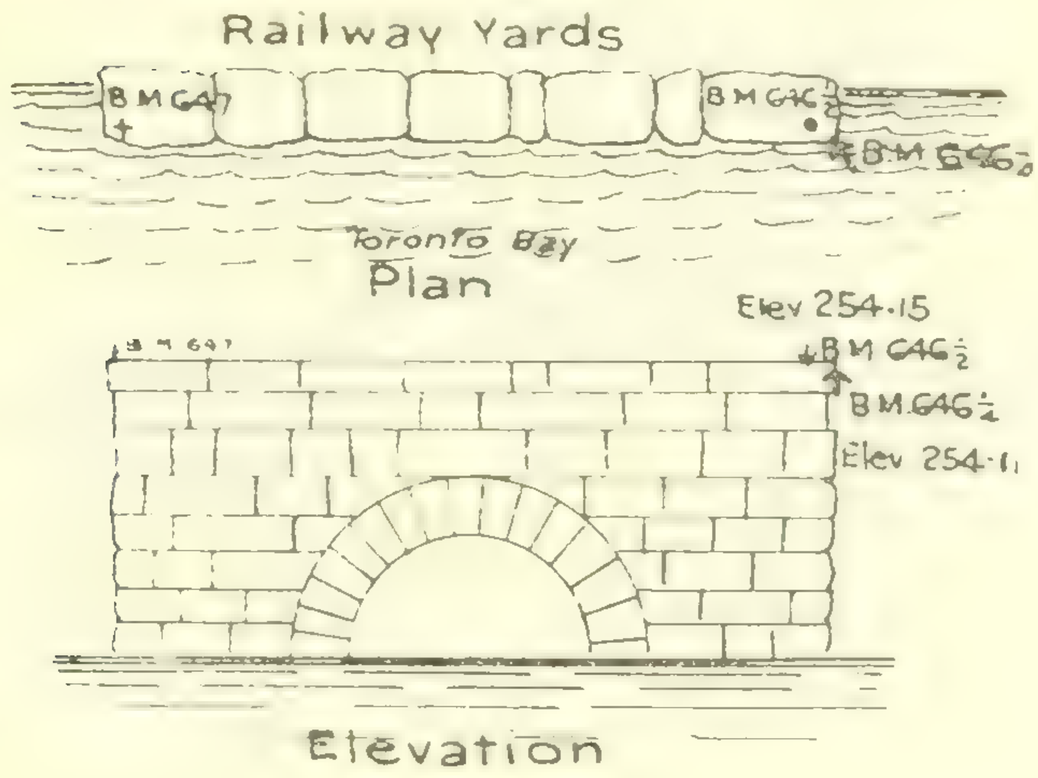
Zero.	Toronto Harbour Commissioners' elevated staff water gauge in same shed and beside Public Works Department gauge register. This staff gauge has an independent strip of wood fastened to it, graduated into decimals of a foot, and agreeing in readings with Public Works Department gauge register. Queen's Wharf.....	245·00	

TORONTO HARBOUR.

SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
Zero.	Toronto Harbour Commissioners' simple staff gauge, fastened to outer or south face of Queen's Wharf, about 200 feet from west end, and gauge agreeing in readings with original of elevated staff gauge above mentioned.		
Queen's Wharf.			243·00
	Toronto Harbour.		
647	Cross cut in top of coping stone at south-west corner of large arched portal of a sewer about 800 feet north-west of west end of Queen's Wharf and on north shore of		254·14
	Toronto Bay.		

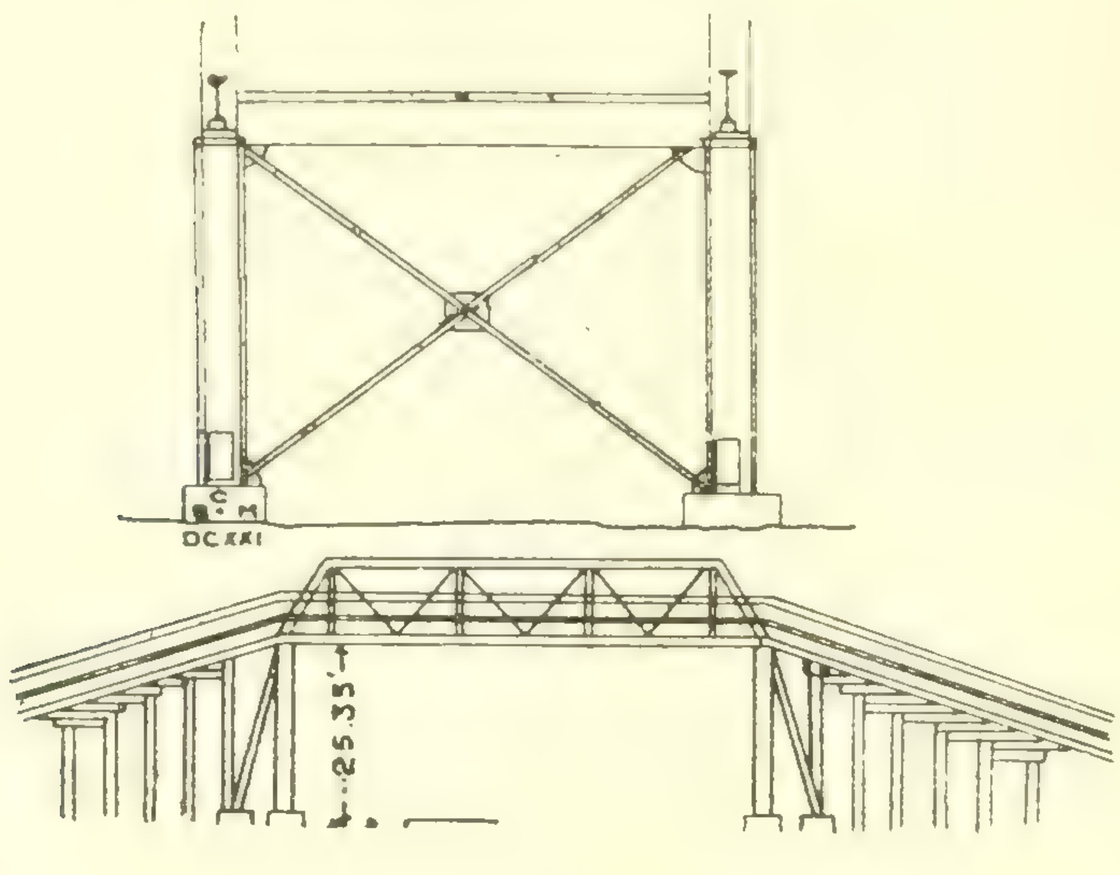


No. 121. Ele. 132·43.	City Engineer's bench mark No. 121, protruding shelf on small iron plate about 2 feet above floor of bridge, screwed into west end of iron truss at west end, south side of Dundas street bridge		377·08

Descriptive List of most Important Permanent Bench Marks—*Continued.*

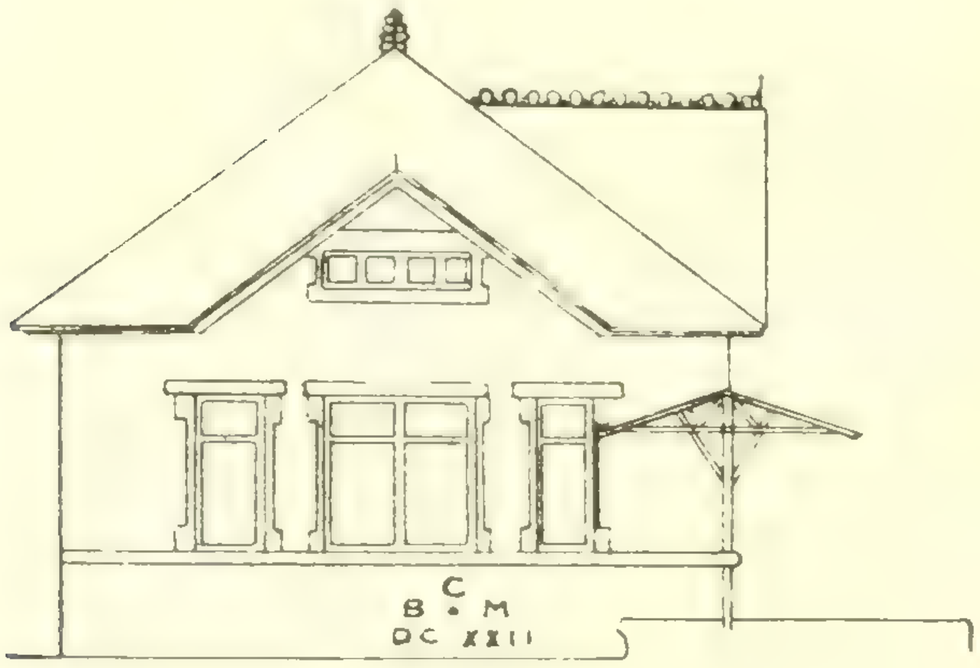
Bench Marks.	Description and Location.	Elevations. Instrumental.	Adjusted.
DCXXI.	Chisel line in end of copper plug, driven horizontally into north face of stone pier under east column of iron trestle supporting south end of bridge over C.P.R. tracks, overhead crossing of Weston road, just west of C.P.R. station.....	396·63	

Toronto Junction.



DCXXII.	Chisel line in end of copper plug driven horizontally into stone, about 3 feet above ground, under centre window east end of C.P.R. station at....	407·26	

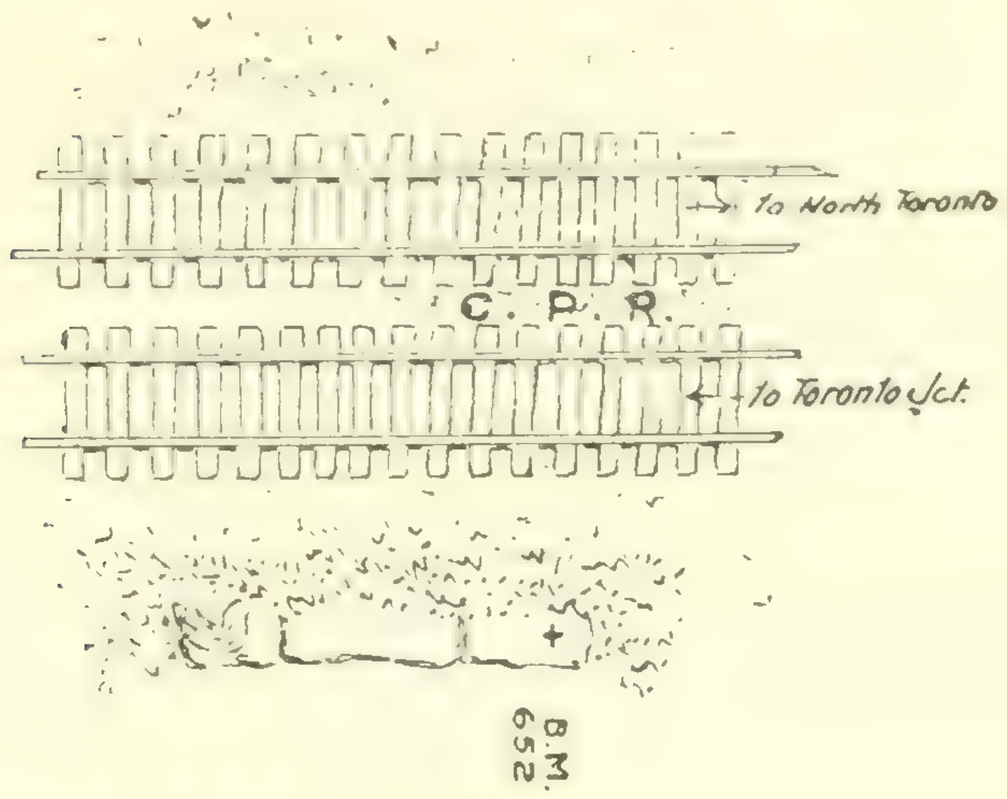
North Toronto.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

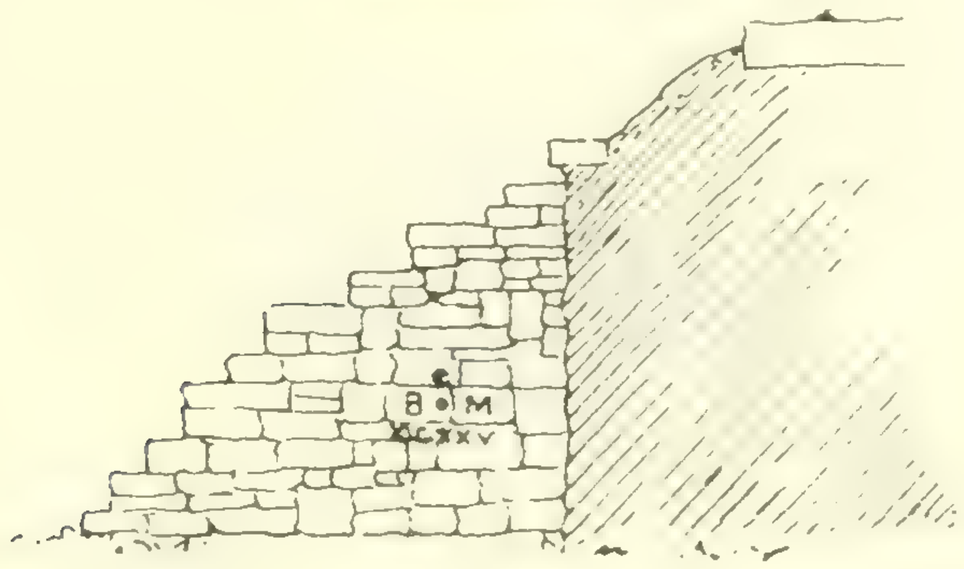
Bench Marks.	Description and Location.	Elevations. Instrumental.	Adjusted.
652	Cross cut in top of stone at south east corner of stone box culvert under C.P.R. from Toronto Jct. to North Toronto opposite Galina Oil Co's store house, and 18 feet west of crossing of G.T.R. to Barrie and North Bay.....	393·87	

Toronto.



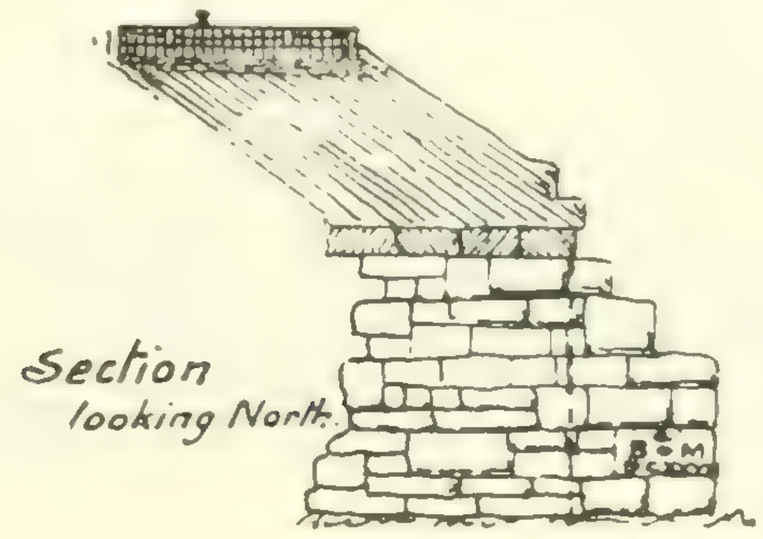
DCXXV.	Chisel line in end of copper plug driven horizontally into stone opposite fourth altar-step from bottom in north face of south retaining wall at east end of stone arch culvert under G.T.R. just north of factory of the Worsted & Braid Co.....	432·60	432·60

Toronto.

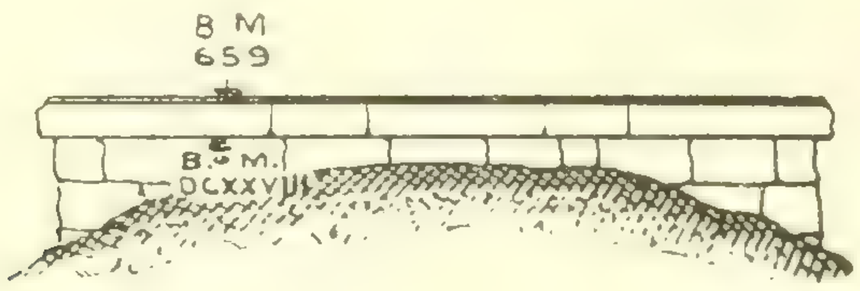
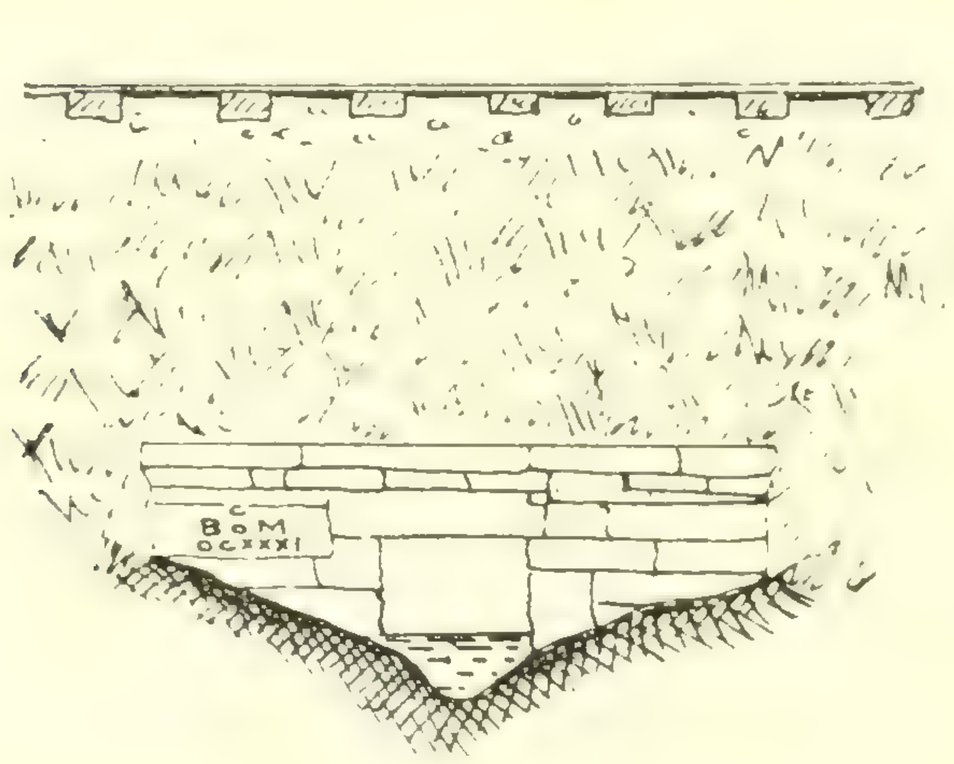
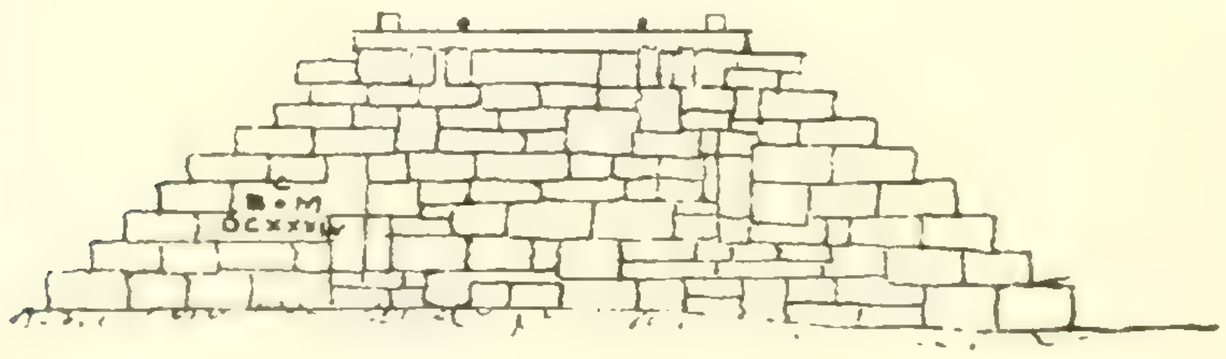


DCXXVII.	Chisel line in end of copper plug driven horizontally into stone, in south face of small wing, or retaining wall at north side, east of track of covered stone culvert under G.T.R., Lot 18, con. III W., township of York	632·26	632·29

County of York.



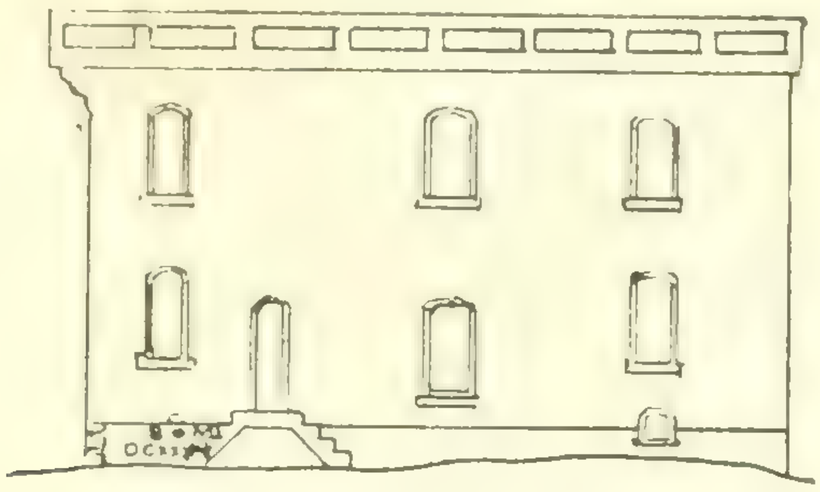
DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCXXVIII.	Chisel line in end of copper plug driven horizontally into second stone from south corner, first course below coping, east, or inner face of retaining wall over west end of large covered stone culvert under G.T.R., 210 paces south of station of Thornhill, and opposite Mrs. Teasdales property, lot 15, con. III, township of Vaughan.....	623·82	623·86
	COUNTY OF YORK.		
			
DCXXXI.	Chisel line in end of copper plug driven horizontally into stone in west end of stone box culvert under G.T.R. about 440 yards north of station of King City, lot 5, con. IV, township of King	947·50	947·58
	KING CITY.		
			
DCXXXIV.	Chisel line in end of copper plug driven horizontally into stone opposite fourth altar-step from ground in south face of north abutment of bridge culvert under G.T.R. about 150 yards south of mile post 28 from Toronto and on lot 14, con. I, township of King.....	965·64	965·74
	COUNTY OF YORK.		
			

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

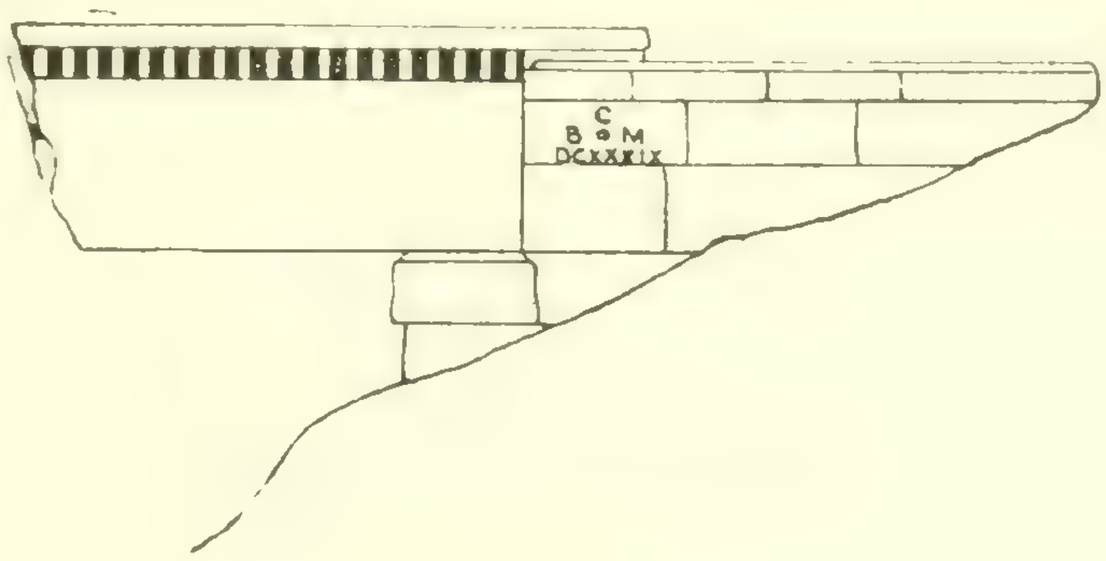
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCXXXV.	Cnisel line in end of copper plug, driven horizontally into stone in top course of foundation feet from south corner of east end of shoe factory belonging to Underhill Seaman & Co.....	884.65	883.76

AURORA.



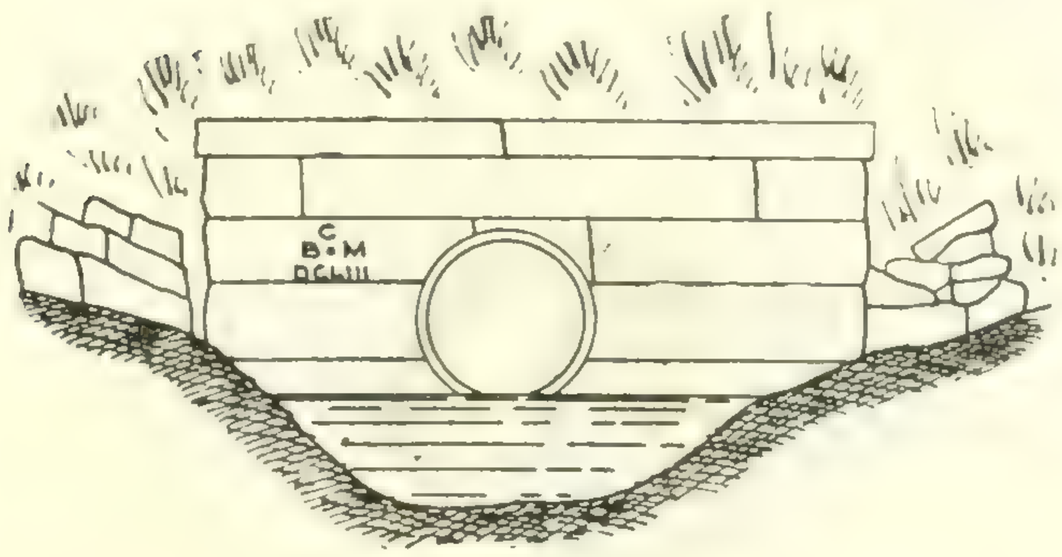
DCXXXIX.	Chisel line in end of copper plug driven horizontally into second stone from top east side of north abutment of G.T.R. bridge over Newmarket branch of Holland river, just north of Timothy street crossing.....	777·28	777·41

NEWMARKET.



DCLIII.	Chisel line in end of copper plug driven horizontally into stone in second course below coping, west end of covered stone culvert under G.T.R. one mile north of Bradford, about 575 feet north of mile post 43 from Toronto and on lot , con. VIII, township of West Gwillimbury.....	726·16	726·32

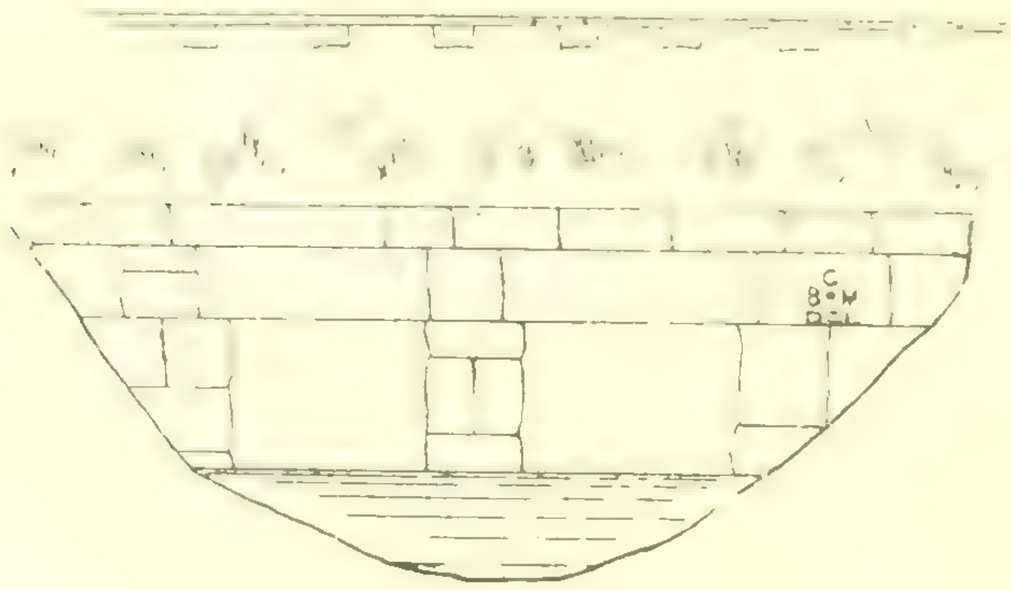
COUNTY OF SIMCOE.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

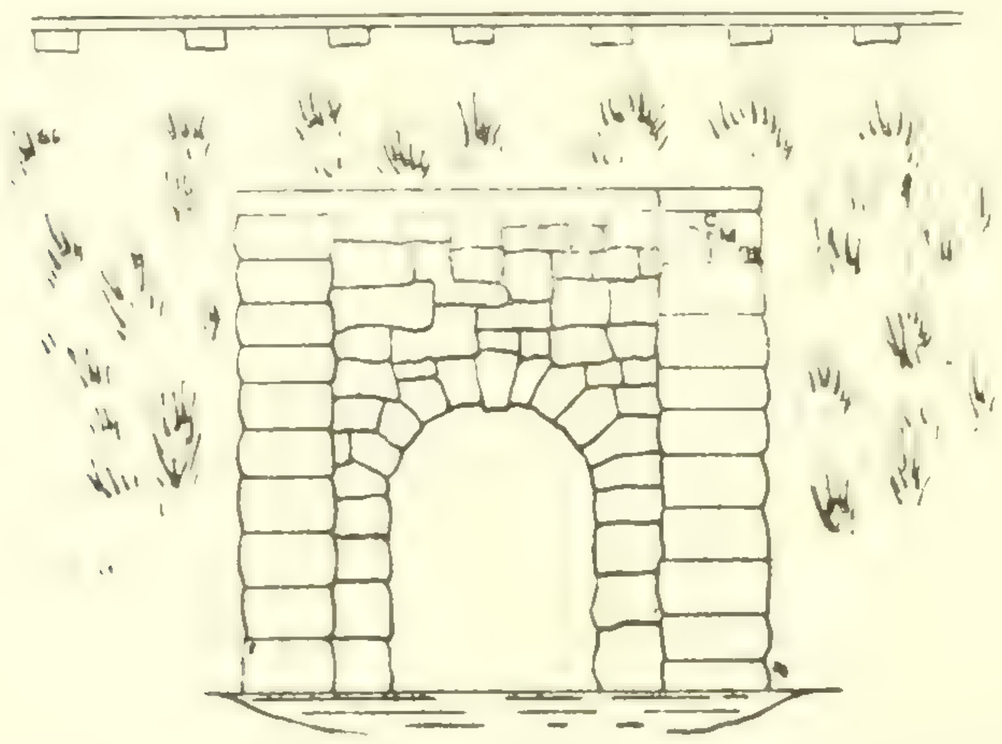
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCXL.	Chisel line in end of copper plug driven horizontally into stone in first course from top, west end near south corner of double box culvert under G.T.R., about 350 feet north of town line, and on lot 21, con. I, township of Innisfil.....	747·59	747·68

County of Simcoe.



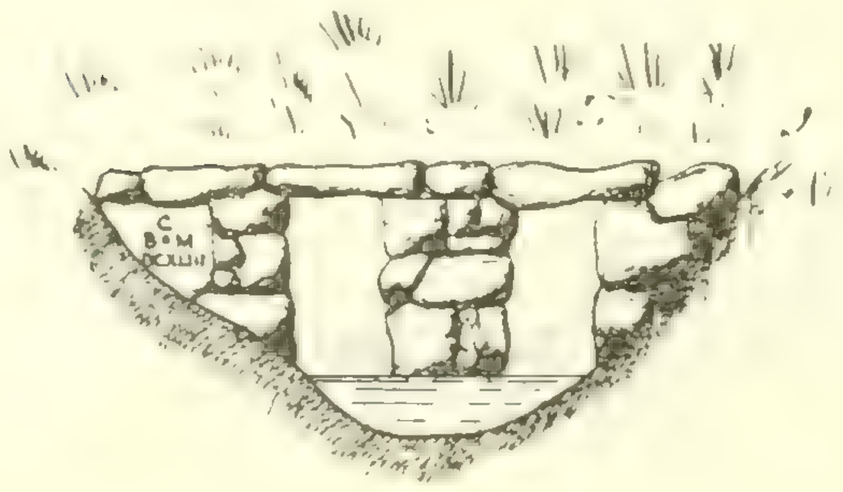
DCXLVII.	Chisel line in end of copper plug driven horizontally into end of first altar step below coping, of retaining wall on north side east end of arched stone culvert under G.T.R. about 470 yards north of Lefroy crossing, and on Henry Groves property, lot 21, con. IV, township of Innisfil.....	757·50	757·70

County of Simcoe.



DCXLIII.	Chisel line in end of copper plug driven horizontally into stone in west end of double box culvert under G.T.R., about 150 yards south of Craigvale crossing, and on lot 17, con. IX township of Innisfil.....	866·24	866·47

County of Simcoe.

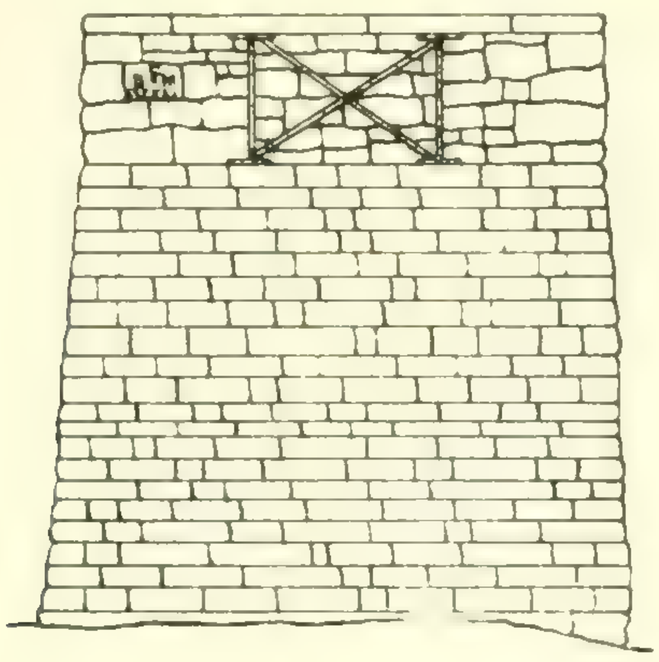


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

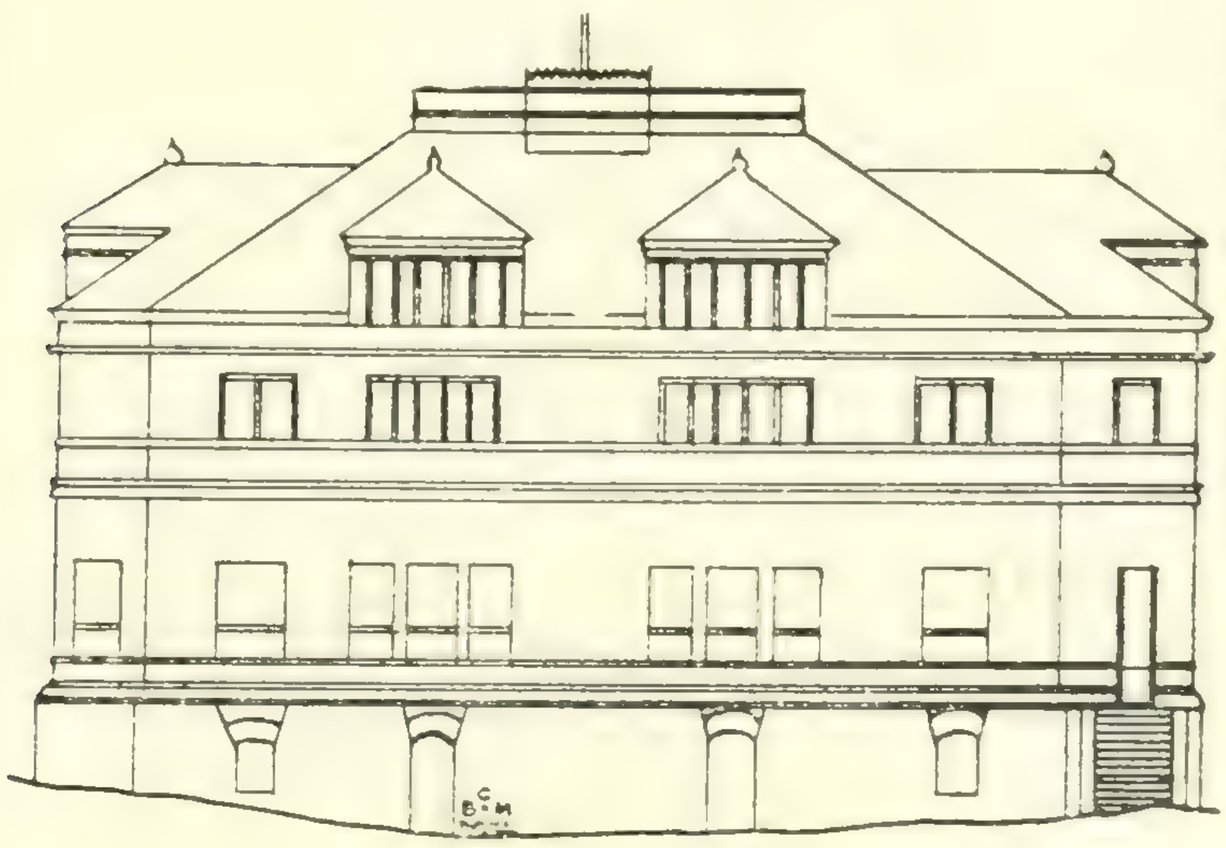
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCXLI	Chisel line in end of copper plug driven horizontally into stone 3 feet below, and south-west of track, south-east or inner face of north-west abutment of G.T.R. bridge over Lovers' Creek, township of Innisfil	789·41	789·65

COUNTY OF SIMCOE.



DCXL.	Chisel line in end of copper plug driven horizontally into stone foundation 1·8 feet above ground, 5·45 feet east of west door, south wall, rear of post office	732·18	732·44

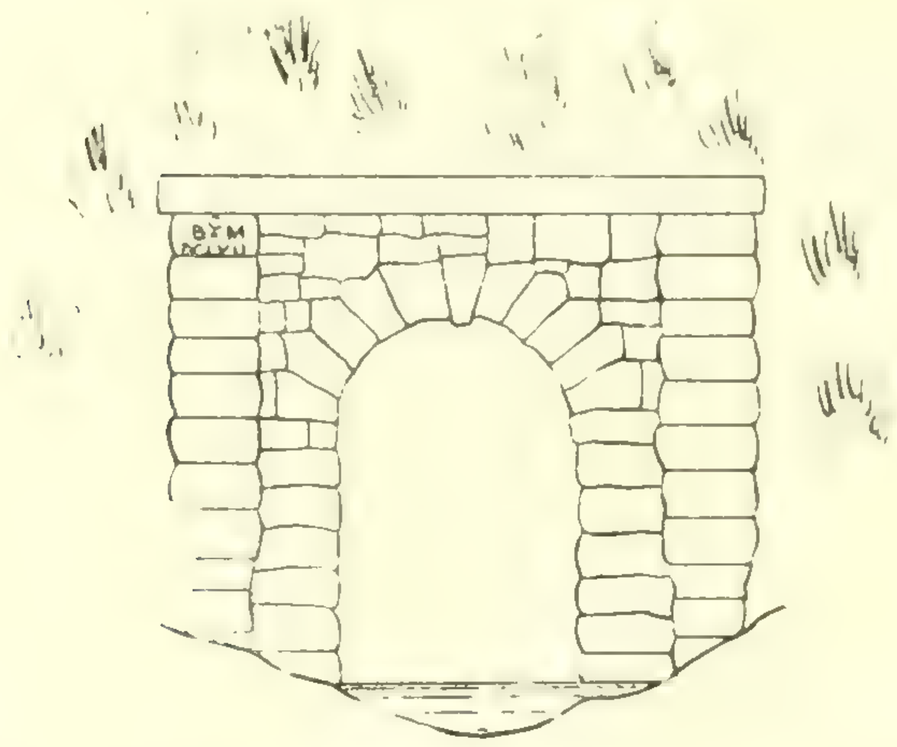
BARRIE.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

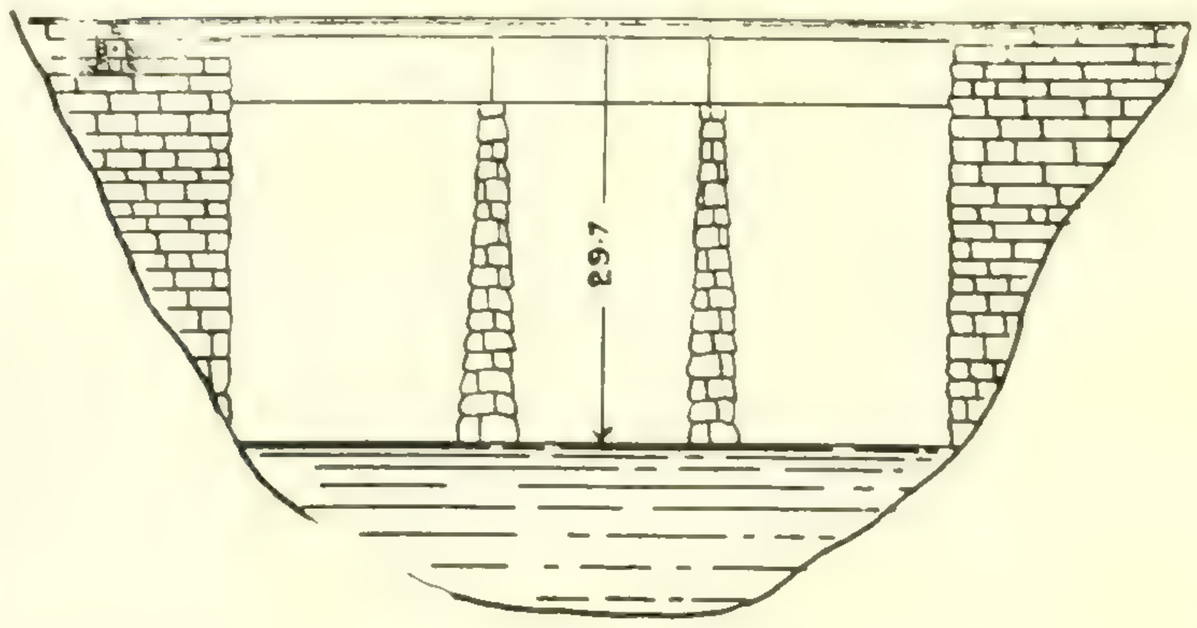
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCLVII	Chisel line in end of copper plug driven horizontally into end of first altar step below coping, on east retaining wall, north end of large arched culvert under G.T.R. about 500 yards from front of lot 32, con. IX, township of Essa.....	732·51	732·79

COUNTY OF SIMCOE.



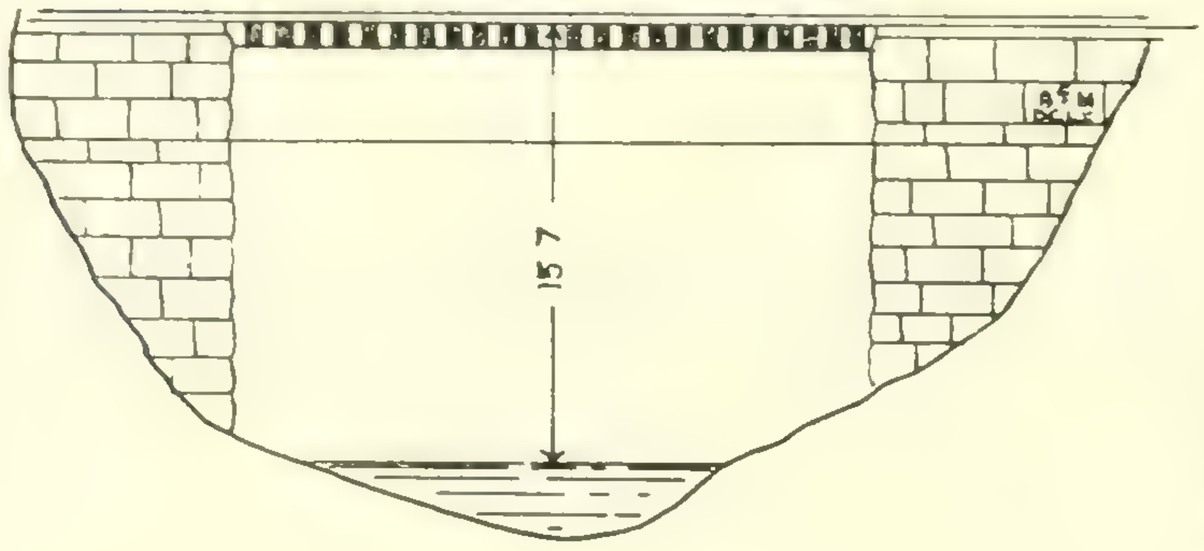
DCLIX.	Chisel line in end of copper plug driven horizontally into stone in second course from top, north side of east abutment of G.T.R. bridge over Nottawasaga river.....	628·83	629·13

ANGUS.



DCLX.	Chisel line in end of copper plug driven horizontally into stone in second course from top, south face of east abutment of G.T.R. bridge over Pine river.....	621·28	621·59

ANGUS.

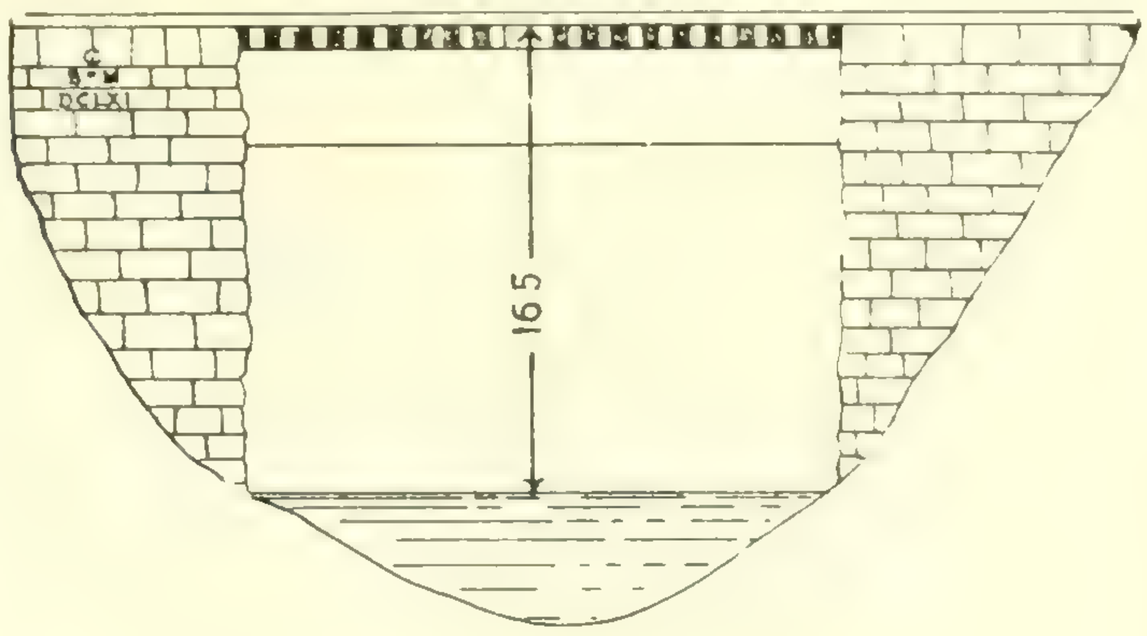


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

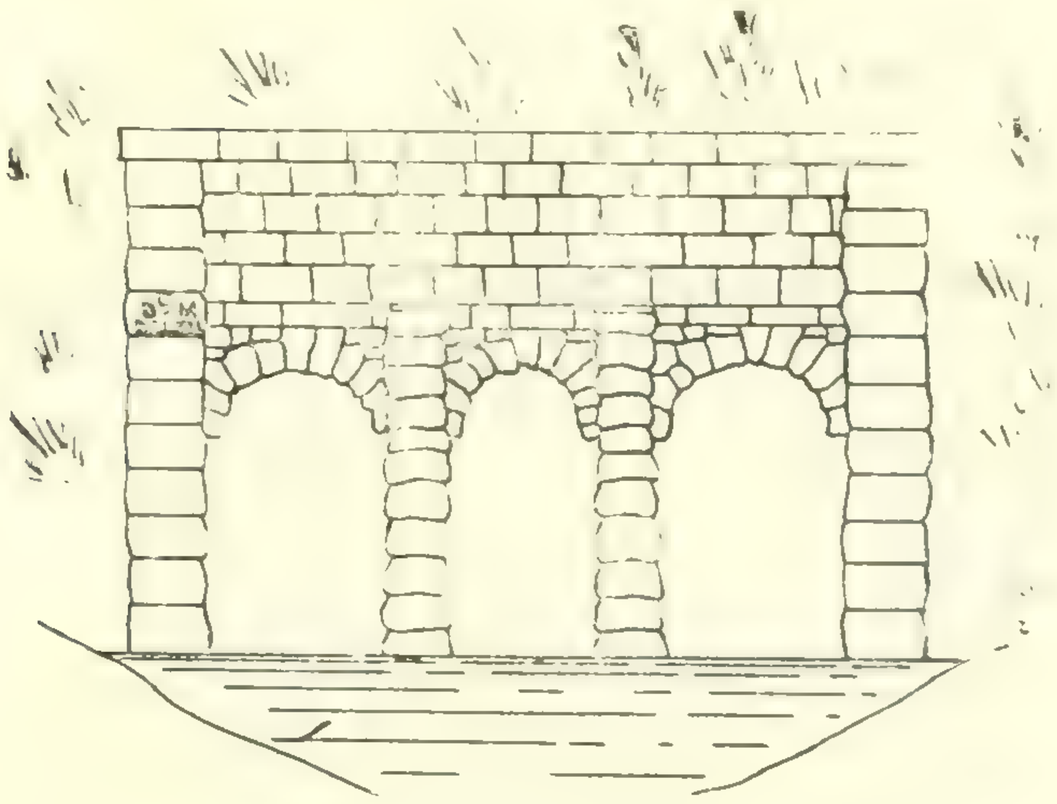
Bench Marks.	Description and Location.	Elevations. Instrumental	Elevations. Adjusted.
DCLXI.	Chisel line in end of copper plug driven horizontally into stone in second course from top, south-west side of north-west abutment of G.T.R. bridge over Mad river, Essa.....	625·52	625·83

COUNTY OF SIMCOE.



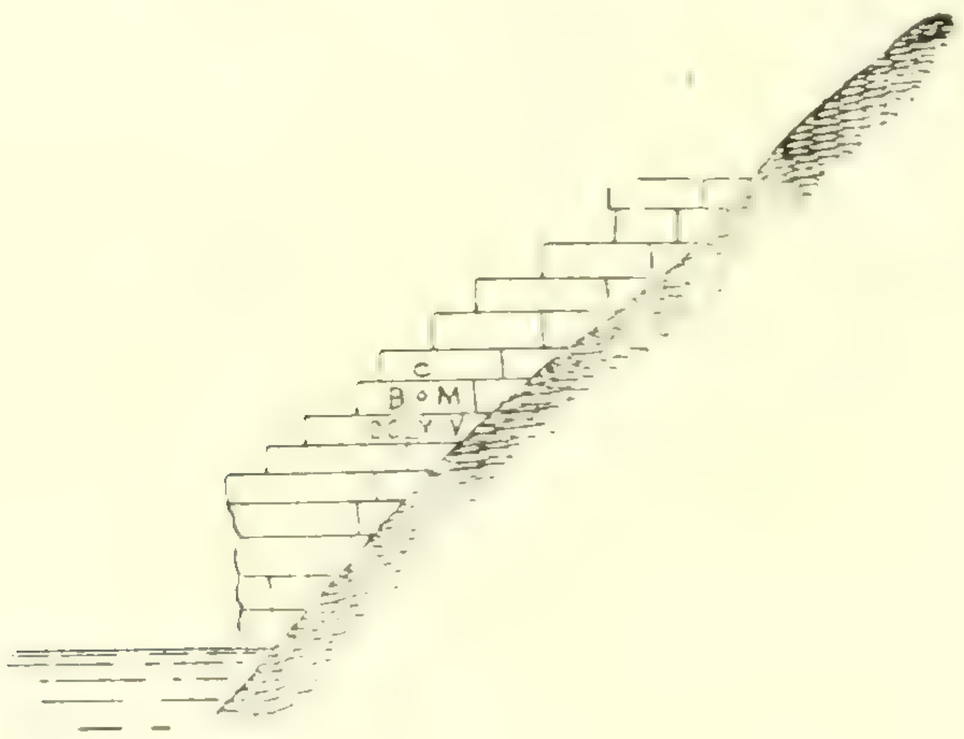
DCLXII	Chisel line in end of copper plug driven horizontally into end of fourth altar step, below coping, on retaining wall on east corner of large triple arch culvert under G.T.R. spanning Coates creek. 300 yards southeast of G.T.R. station.....	655·41	655·73

NEW LOWELL.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

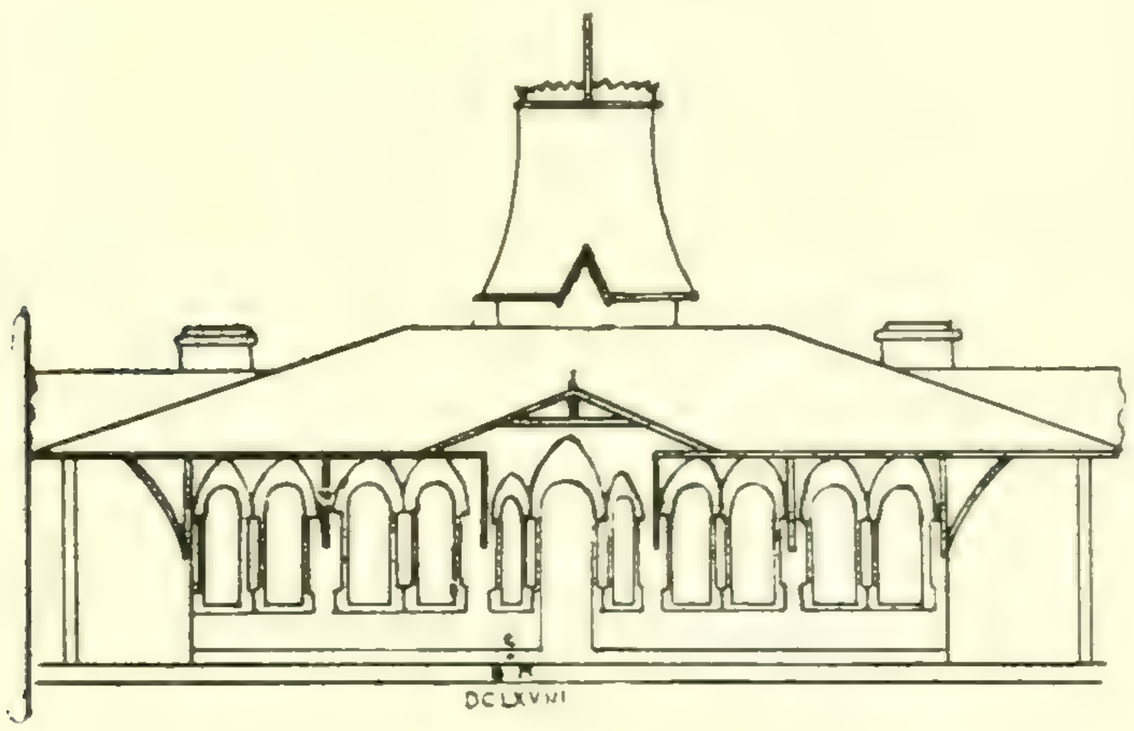
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCLXIV.	Chisel line in end of copper plug driven horizontally into stone east face of fifth altar step below coping, south-east wall, south-west of track of arched stone culvert under G.T.R. 237 feet south-east of mile post 85 from Toronto and on lot 23, con. II, township of Nottawasaga.....	700·05	700·40
	COUNTY OF SIMCOE.		
DCLXVI.	Chisel line in end of copper plug driven horizontally into stone in top course of west side of south abutment of G.T.R. bridge over Batteaux river, on lot 35, con. VI, township of Nottawasaga.....	685·62	686·00
	COUNTY OF SIMCOE.		



SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

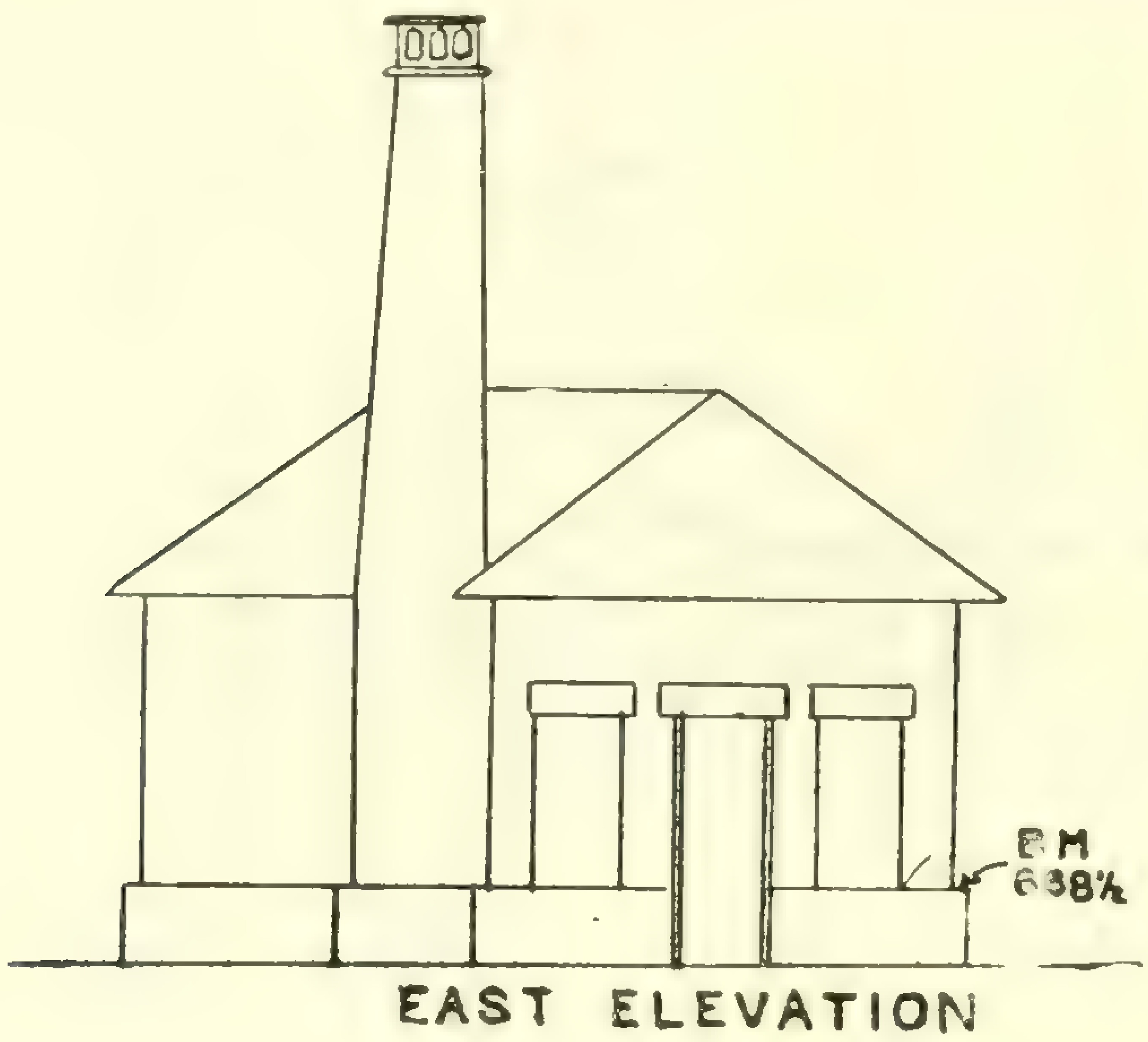
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCLXVIII.	Chisel line in end of copper plug driven horizontally into stone foundation under window, just south of main entrance of G.T.R. station.....	590·55	590·95
	Collingwood.		



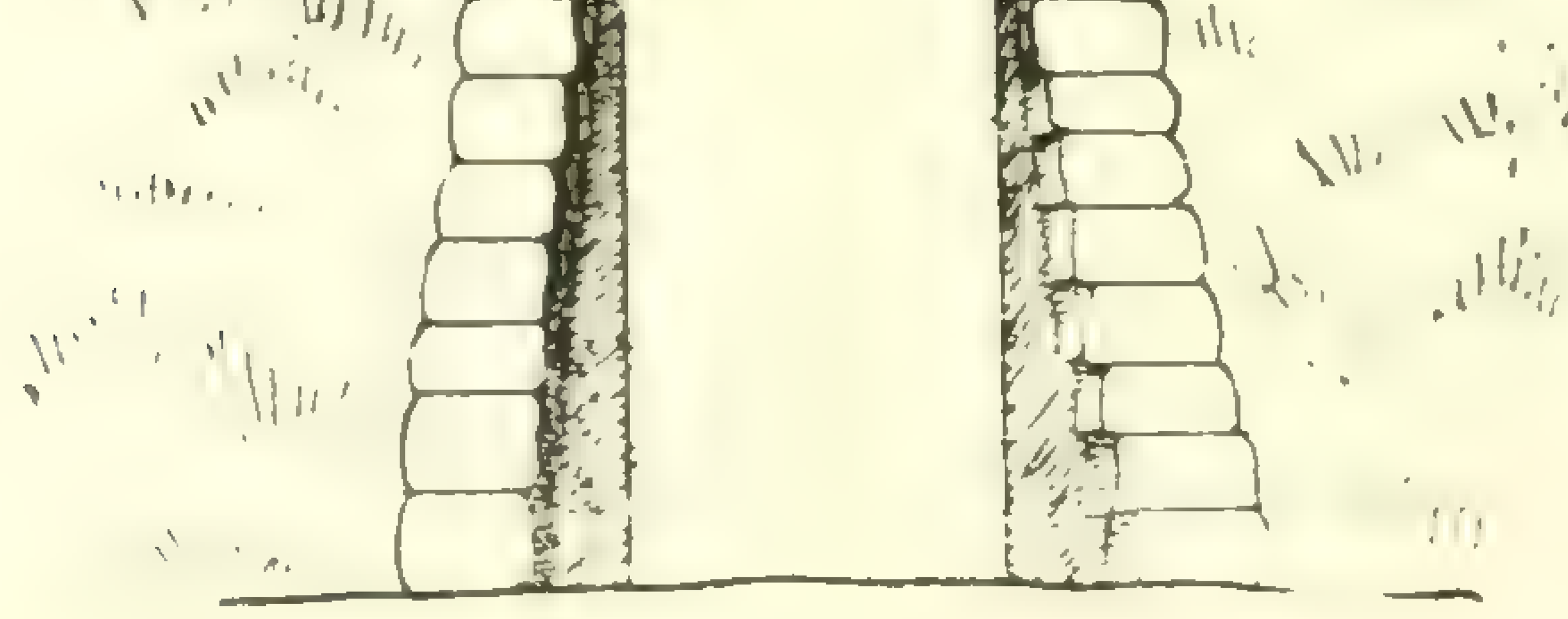
DCLXIX.	Chisel line in end of copper plug driven horizontally into stone in first course above ground, south wall of east wing of pumping house of Collingwood Ship Building Co.....	584·79	585·19
	Collingwood.		

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
668½	Top of iron spike, driven vertically into top of plinth, north-east corner of Collingwood Ship Building Co.'s pumping house. . . .	587·40	587·80
	Collingwood		



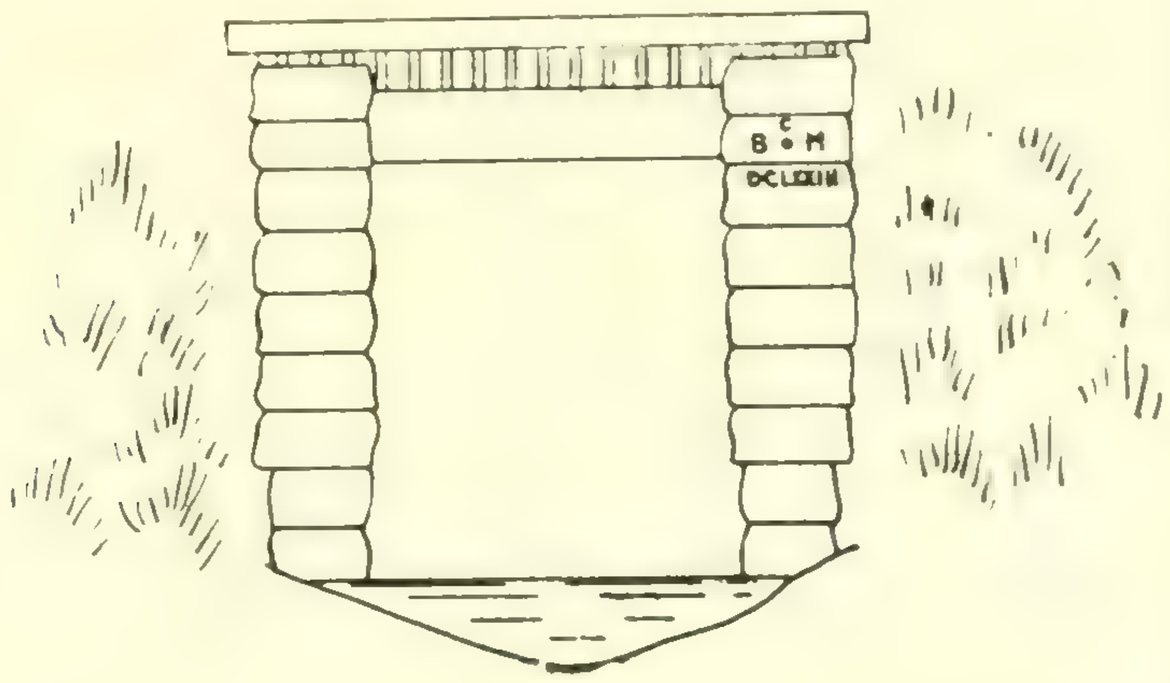
Bench Marks.	Description and Location.	Instrumental.	Adjusted.
DCLXX.	Chisel line in end of copper plug driven horizontally into end of second altar step from top, south end of east wall of stone culvert under G.T.R., 300 feet east of mile post 65, and about 1 mile east of	732·57	732·83
	Barrie.		



Descriptive List of most Important Permanent Bench Marks—*Continued.*

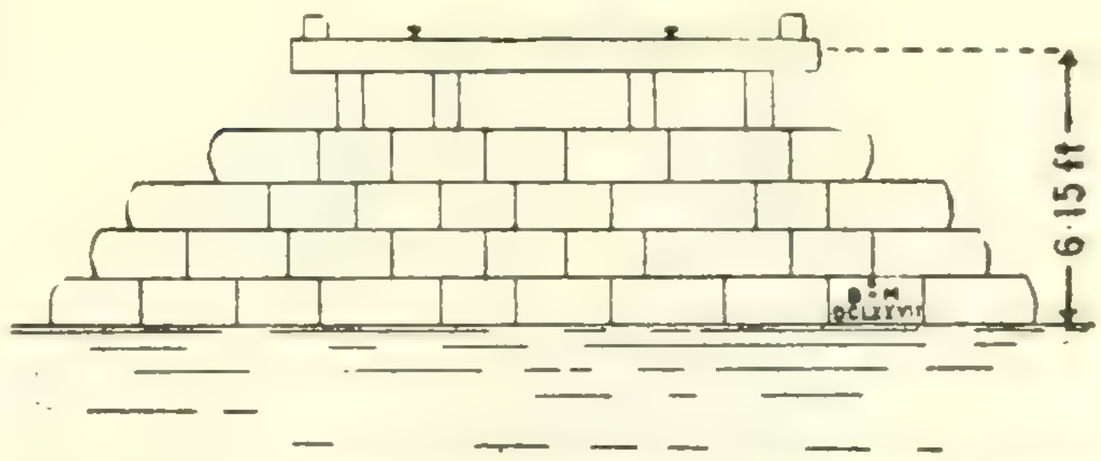
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCLXXIII.	Chisel line in end of copper plug driven horizontally into end of second altar step from top, south end of east wall of open ston culvert under G.T.R., 1 760 feet east of mile post 68 from Toronto and on lot 2 regular line of con. II township of Oro	789·41	789·68

County of Simcoe.



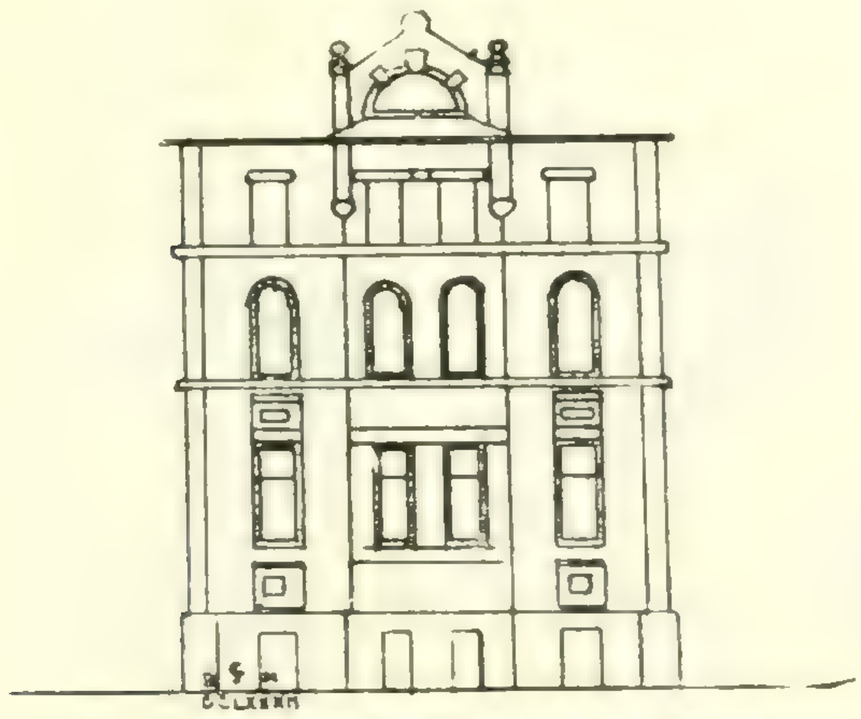
DCLXXVII.	Chisel line in end of copper plug driven horizontally into stone in bottom course west or inner face, near south end of east abutment of small open stone culvert under G.T.R., 1·12 miles east of Oro station, and on lot 24, con. IX, township of Oro .	796·24	796·54

County of Simcoe.



DCLXXXII.	Chisel line in end of copper plug driven horizontally into stone foundation 4½ feet from west corner, front or south face of west wing on south side of	785·68	786·02

Orillia Asylum.

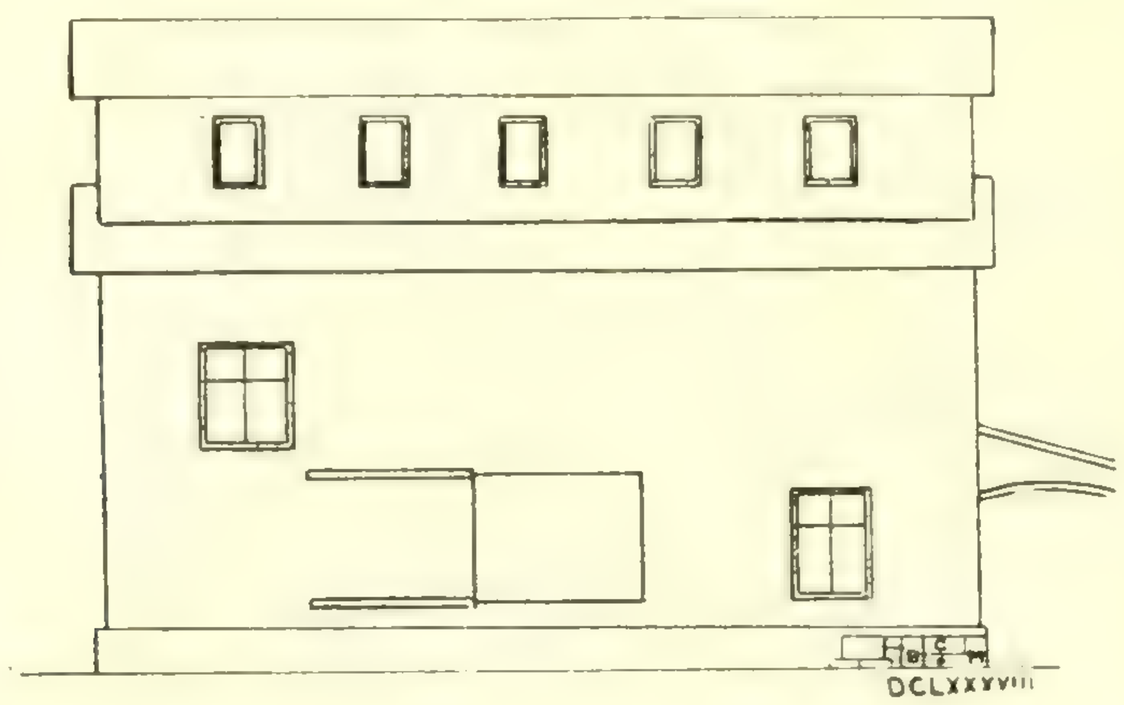


SOUTH ELEVATION OF WESTERN WING

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

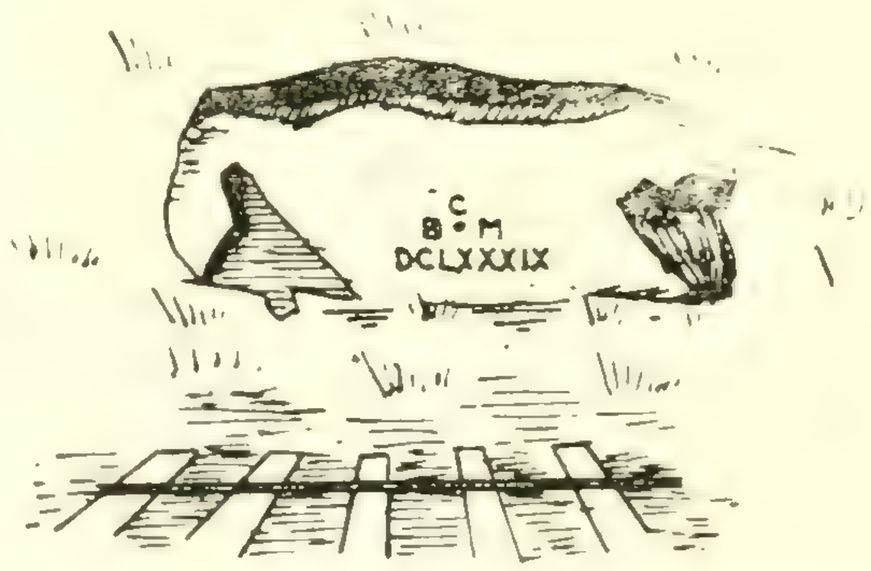
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCLXXXVIII.	Chisel line in end of copper plug driven horizontally into east side face 3·15 feet from north end of foundation of grist mill and elevator of Geo. Vicks and Sons at foot of Tecumseh street ..	731·05	731·40

ORILLIA.



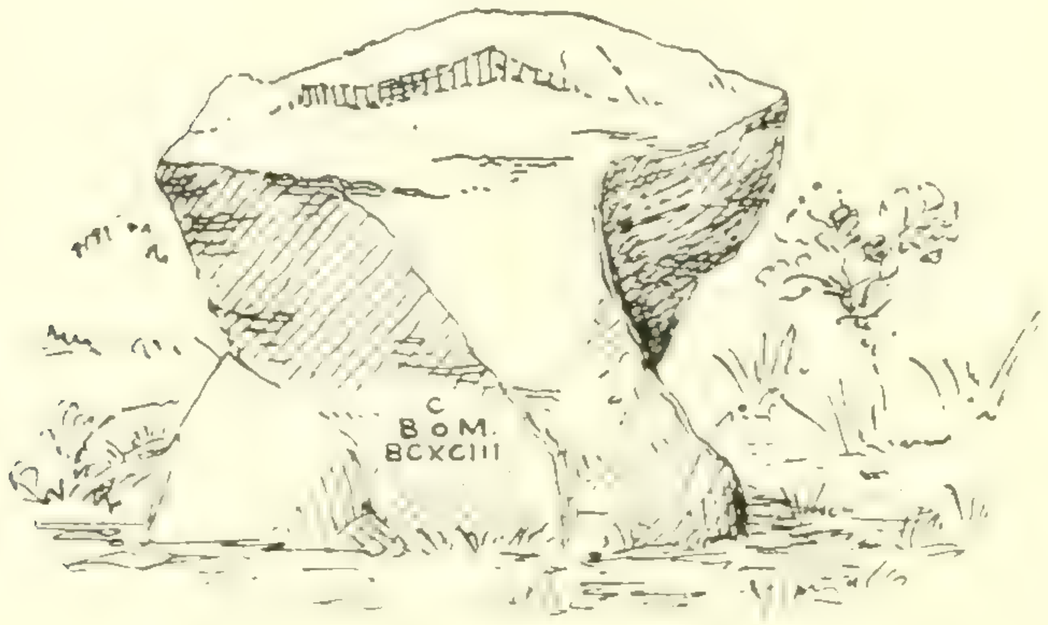
DCLXXXIX.	Chisel line in end of copper plug driven horizontally into side of solid rock 6·7 feet north-east of G.T.R. rail, 2,105 feet north-west of mile post 138–26 and on lot 7, con. IV, township of North Orillia.....	686·96	687·35

COUNTY OF SIMCOE.



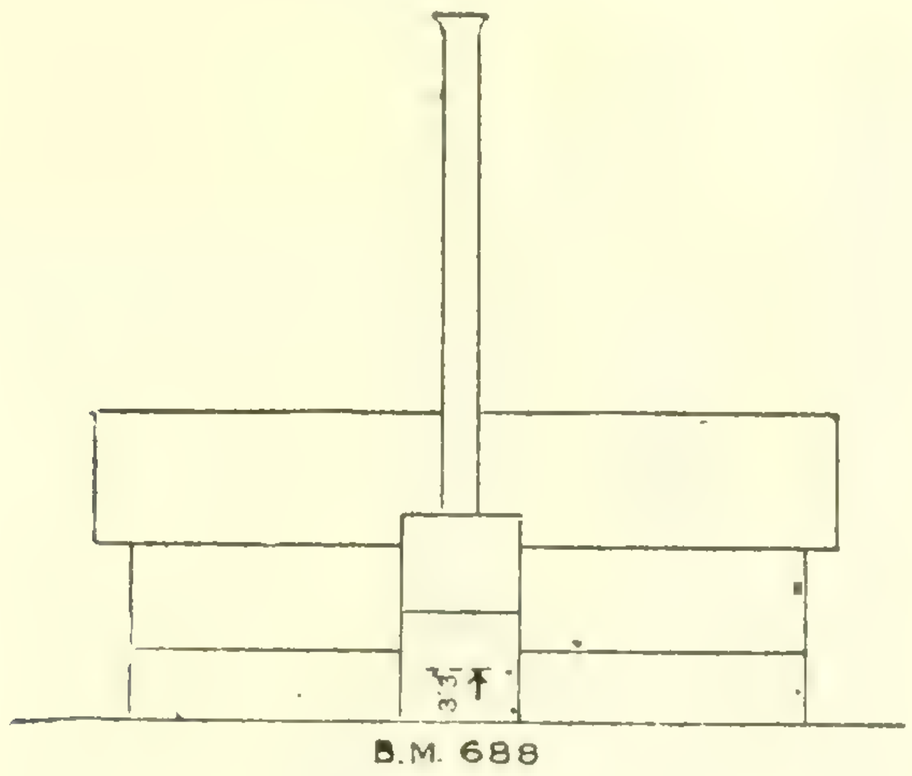
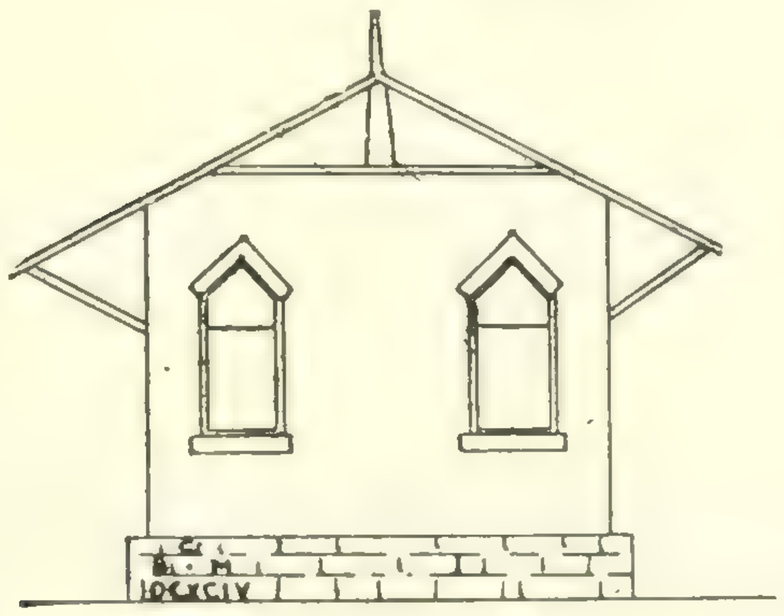
DCXCIII.	Chisel line in end of copper plug driven horizontally into side of rock on G.T.R. right of way, 8·9 feet north-east of track and 1,925 feet east of mile post 145–19 and on lot 20, con. XIV, township of Medonte.....	632·93	633·35

COUNTY OF SIMCOE.



SESSIONAL PAPER No. 19a

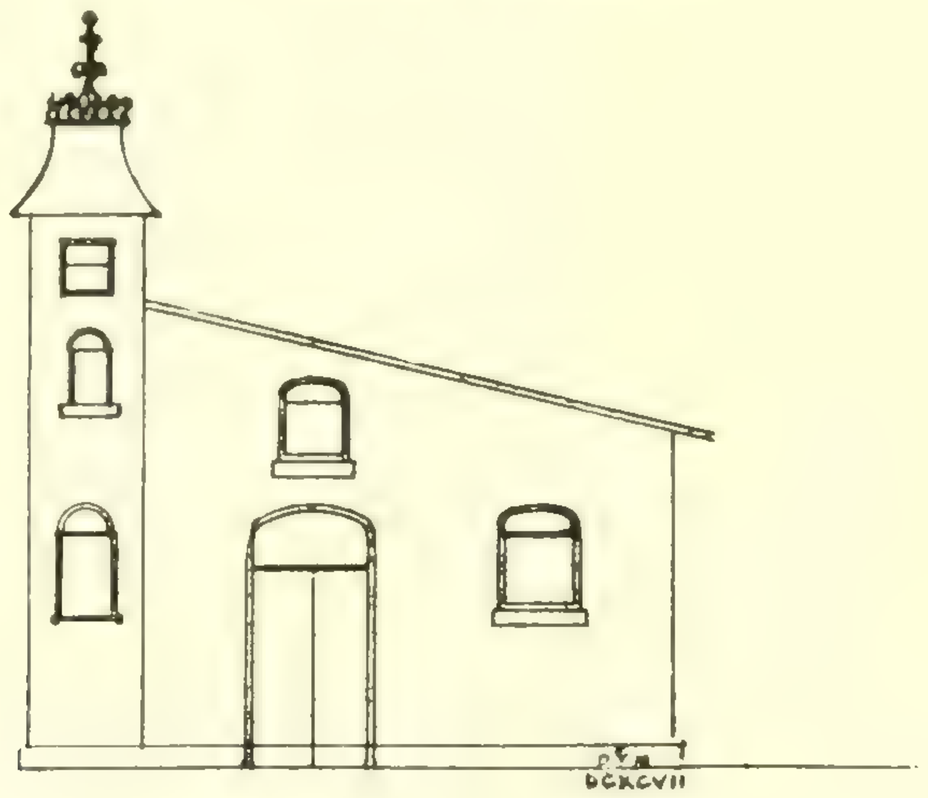
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
688	Crow foot 3·3 ft. above ground, west face of stone foundation of chimney of James Carter's large saw mill.....	586·27	586·71
	Fesserton.		
			
DCXCIV.	Chisel line in end of copper plug driven horizontally into stone foundation 2½ feet above ground and 1 foot from north-east corner north end of G.T.R. station.....	593·65	594·09
	Waubaushene.		
			

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

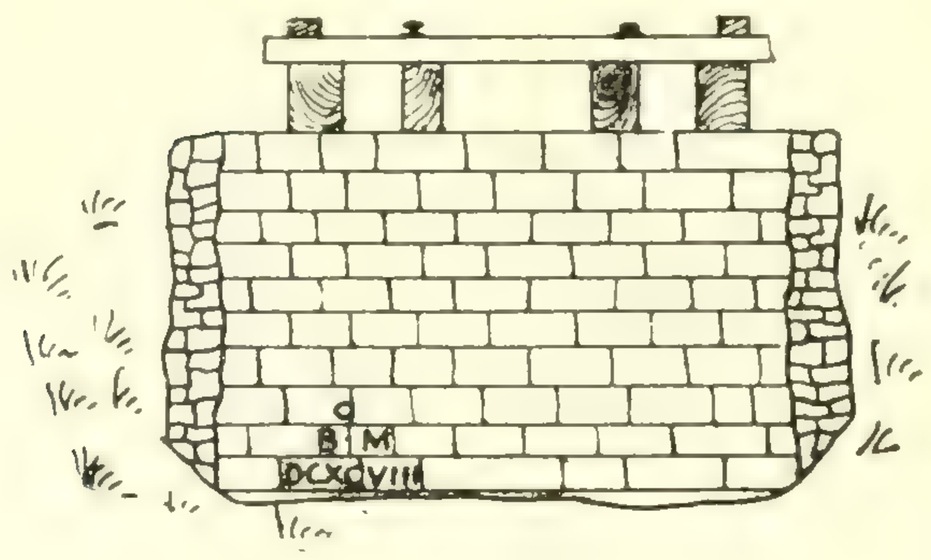
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCXCVII.	Chisel line in end of copper plug driven horizontally into stone foundation 4·6 feet from north-east corner, front of Victoria Harbour Lumber Co.'s power house at	589·24	589·73

VICTORIA HARBOUR.



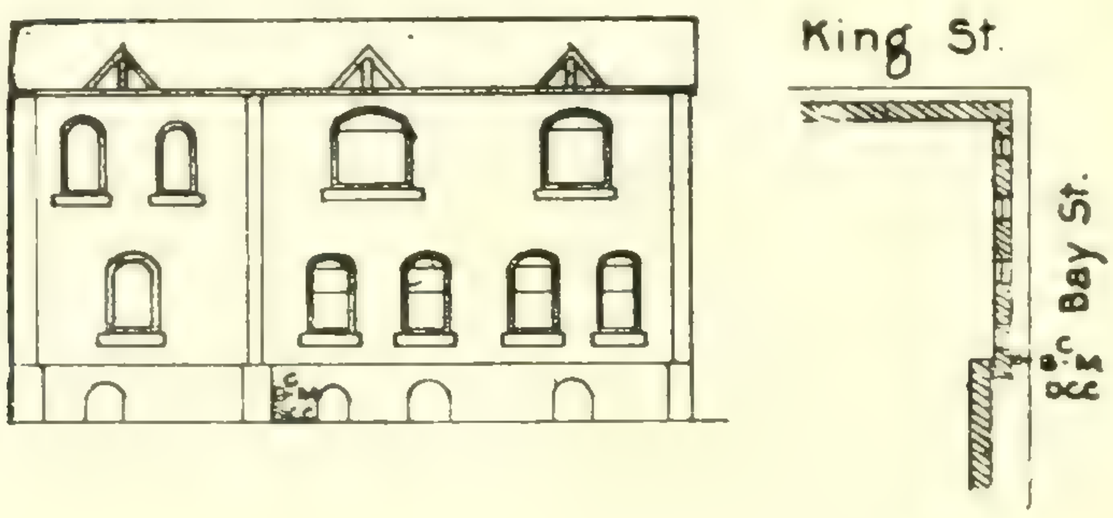
DCXCVIII.	Chisel line in end of copper plug driven horizontally into stone in second course above ground south end of east face of west abutment of G.T.R. bridge over Hog river, west of	587·13	587·63

VICTORIA HARBOUR.

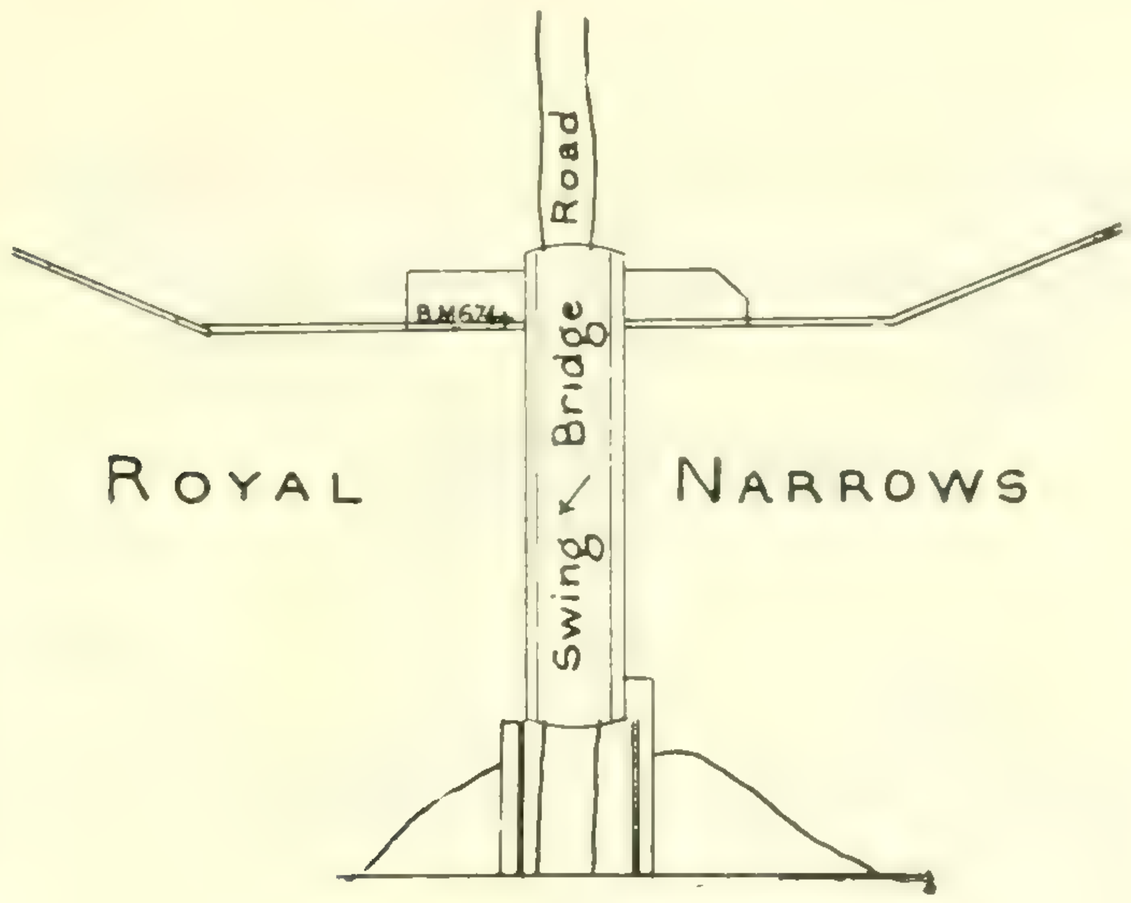
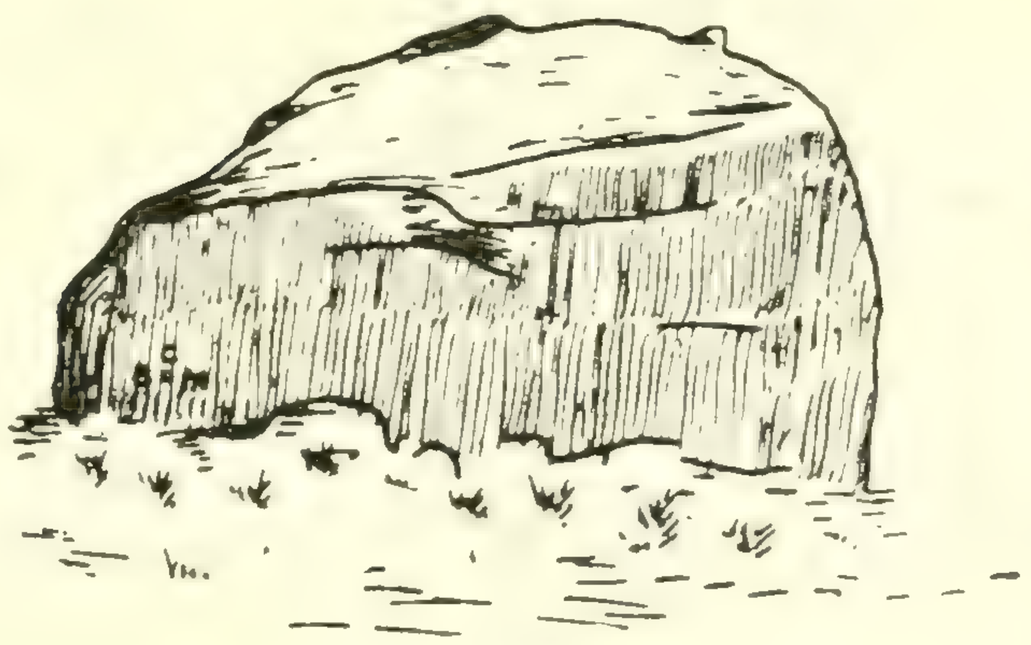
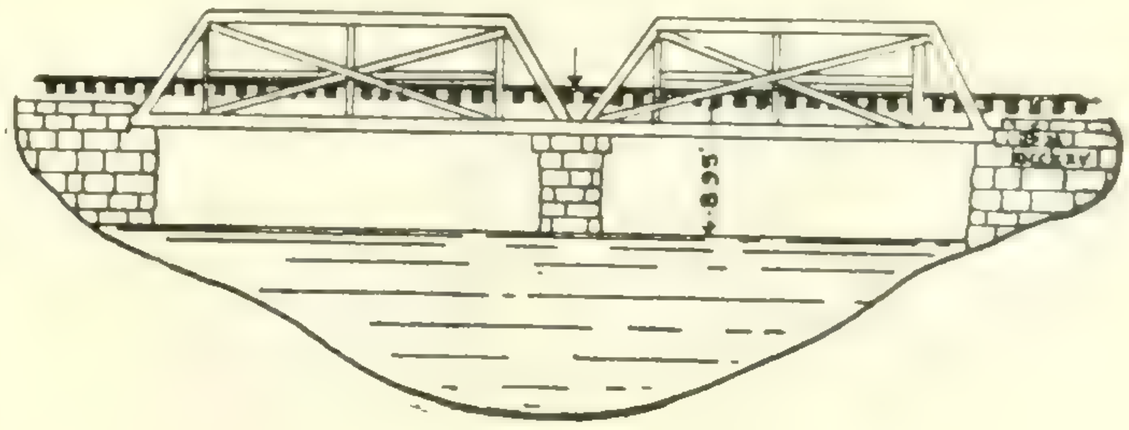


DCC.	Chisel line in end of copper plug driven horizontally into stone foundation 1·2 feet above granolithic pavement under space between 4th and 5th first floor windows from front, north wall (south side of Bay street) of Queen's hotel.....	597·94	598·50

MIDLAND.



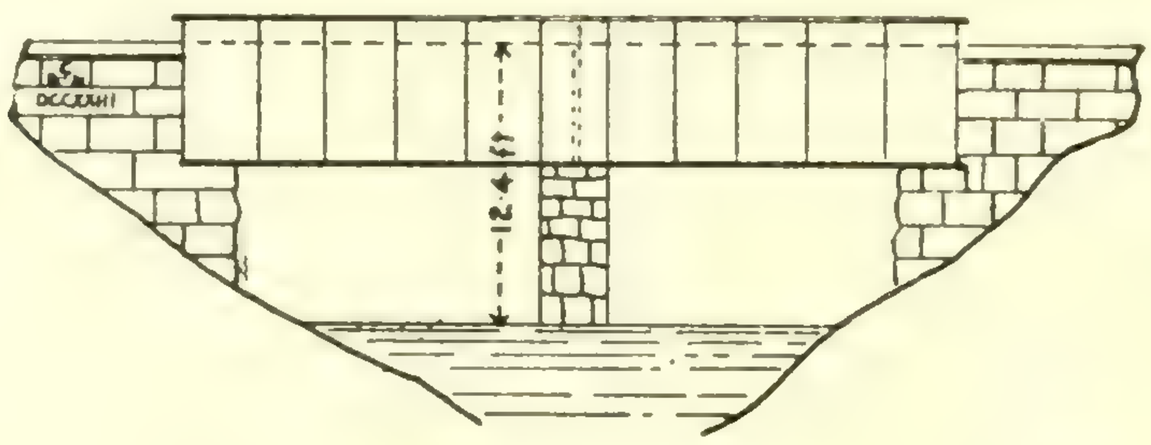
Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
674	Cross cut in top of south-west corner of concrete pier immediately north of turn-table of iron road bridge over Royal Narrows..	721·91	722·26
	Athelley Junction.		
			
DCLXXXVII.	Chisel line in end of copper plug driven horizontally into north end of base of west face of solid rock 60 feet west of main track and opposite mile post 94–133.....	729·65	729·99
	Longford.		
			
DCCXXV.	Chisel line in end of copper plug driven horizontally into stone in second course from top, east face of north abutment of G.T.R. bridge over east branch of Severn river south of.....	724·09	724·42
	Washago.		
			

Descriptive List of most Important Permanent Bench Marks—*Continued.*

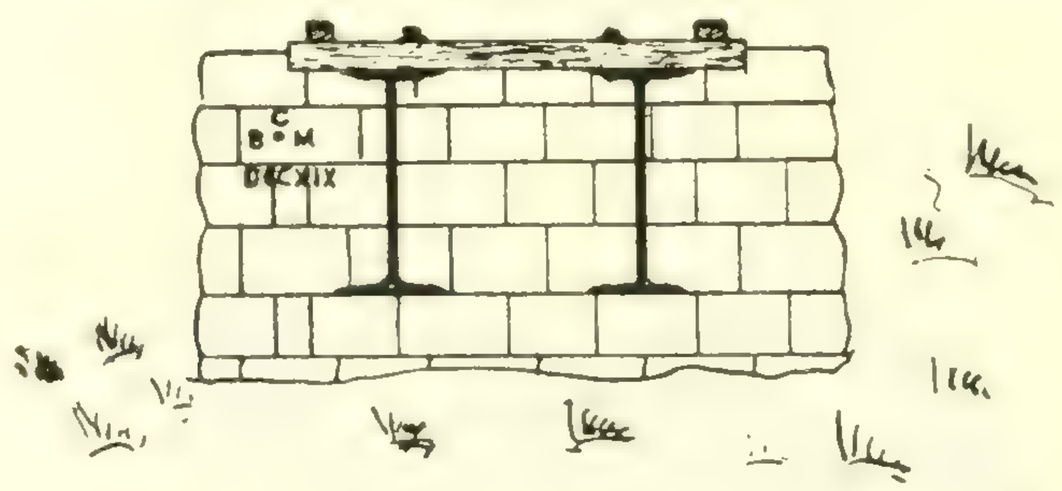
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCCXXIII.	Chisel line in end of copper plug driven horizontally into west face, top stone west end of north abutment of G.T.R. bridge over west branch of Severn river, on lot 10, con, XV, township of North Orillia	729·15	729·47

County of Simcoe.



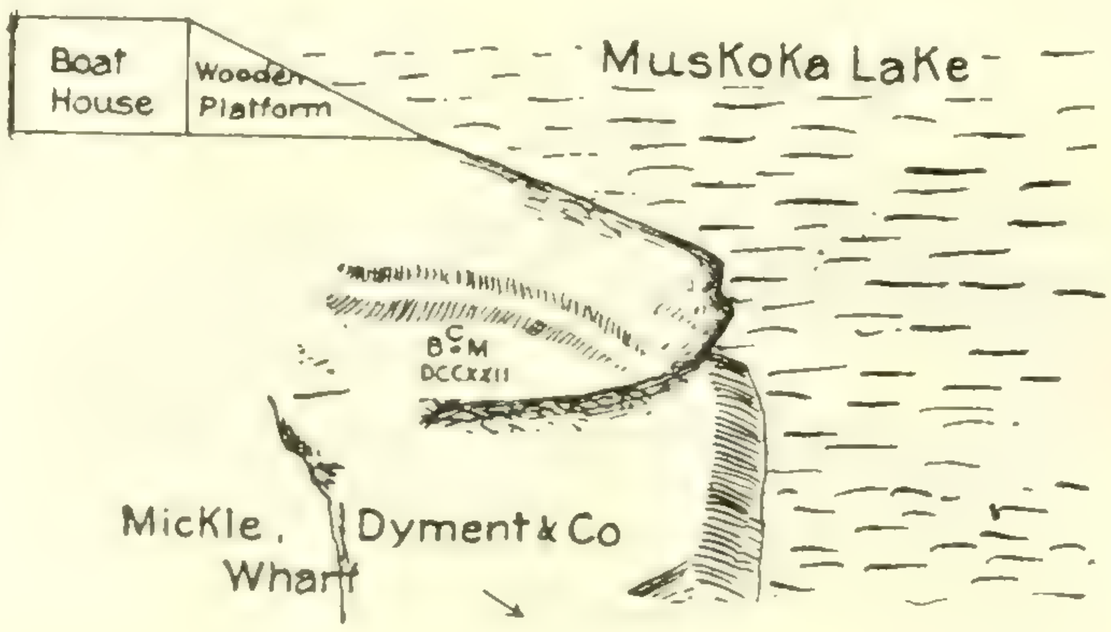
DCCXIX.	Chisel line in end of copper plug driven horizontally into second course from top, south face of north abutment, west side of track of G.T.R. bridge over Kashabagamog river, lot 21, con. VI., township of	715·74	716·05

Morrison.



DCCXII.	Top of copper plug driven perpendicularly into solid rock at Mickle Dyment & Co.'s wharf, some 225 feet (over the water) west of end G.T.R. Muskoka wharf	746·03	746·32

Gravenhurst.

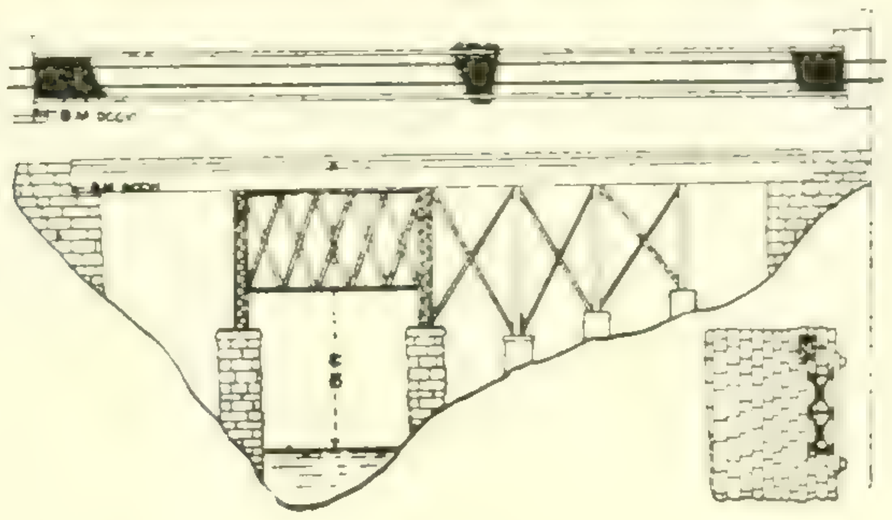


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCCVI.	Chisel line in end of copper plug driven horizontally into 3rd course from top, north face of east end of south abutment of G.T.R. bridge over south branch of Muskoka river, on lot 2, con. XIII, township of Draper.....	797·02	797·29

Draper.

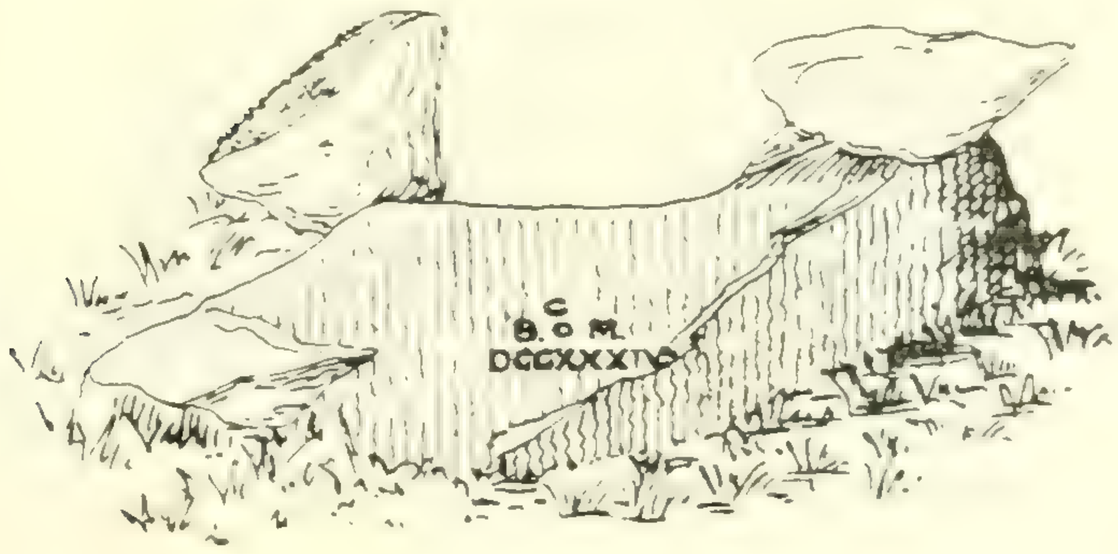


692	Cross cut on coping of seat, south side of west abutment of steel bridge over Muskoka river (87 feet east of track) at foot of Thomas street.....	807·78	808·05

Bracebridge.

DCCXXXIV.	Chisel line in end of copper plug driven horizontally into west face of solid rock 8·7 feet east of track and 140 feet north of centre of crossing at station of.....	1,037·57	1 037·80

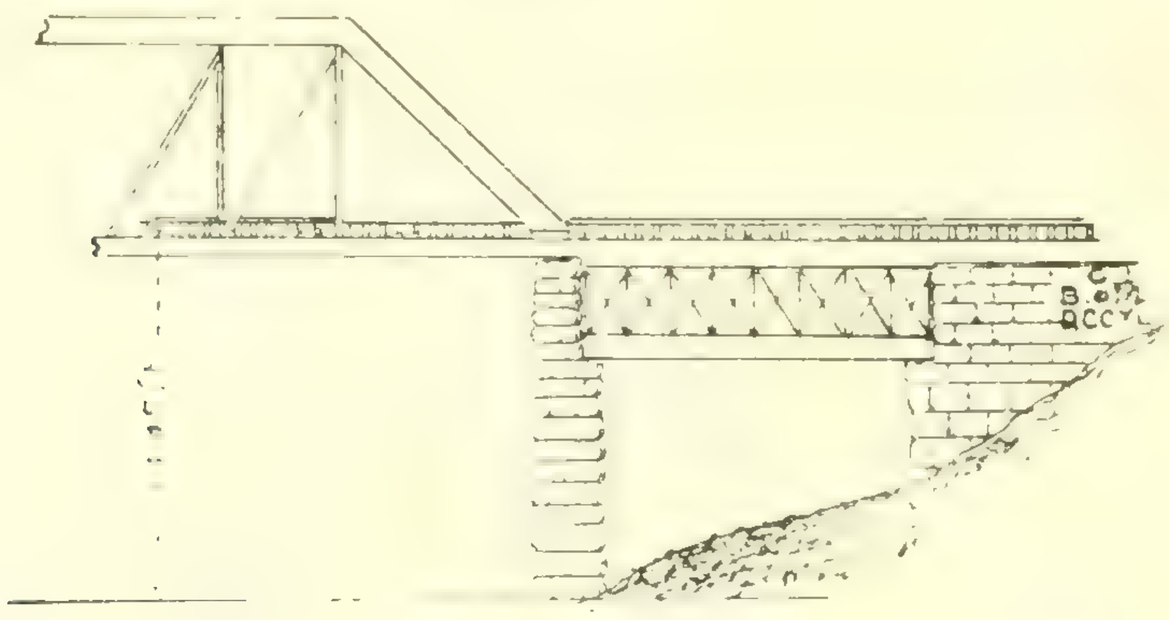
Utterson.



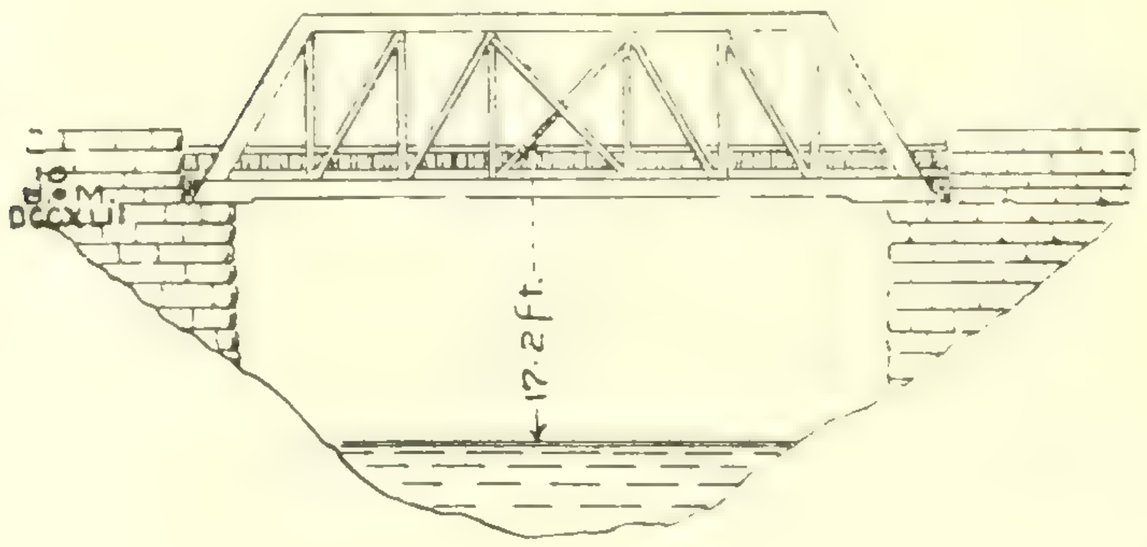
DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCXL.	Chisel line in end of copper plug driven horizontally into 2nd course from top, south end of west side of south abutment of G.T.R. bridge over Narrows, between Lakes Vernon and Fairy, at Huntsville.	964·71	964·92
DCCXLII.	Chisel line in end of copper plug driven horizontally into 4th course from top, south end, east side of south abutment of G.T.R. bridge over Big East river, township of.....	954·10	954·30
DCCLXXI.	Chisel line in end of copper plug driven horizontally in solid rock 6·8 feet east of track, 155 feet north of semaphore and 65 feet north of crossing.....	1,082·82	1,082·99

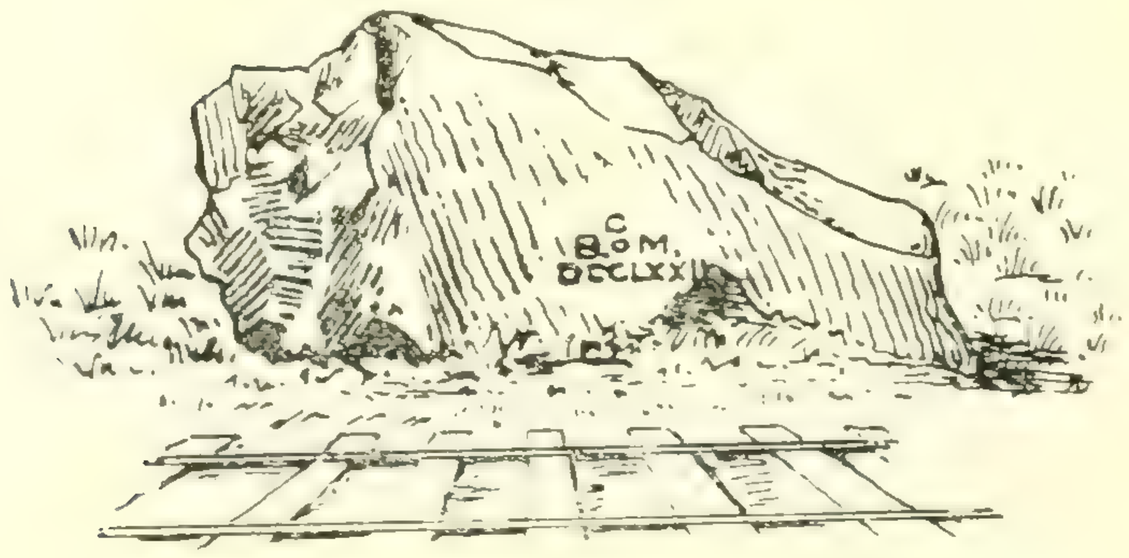
HUNTSVILLE.



CHAFFEY.



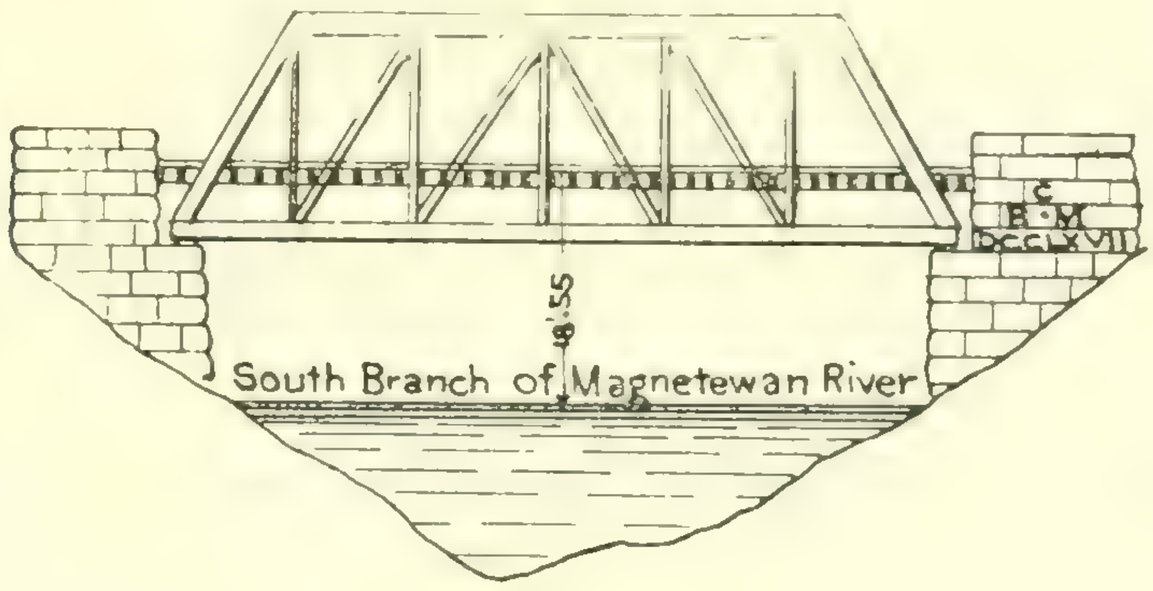
SCOTIA JUNCTION.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

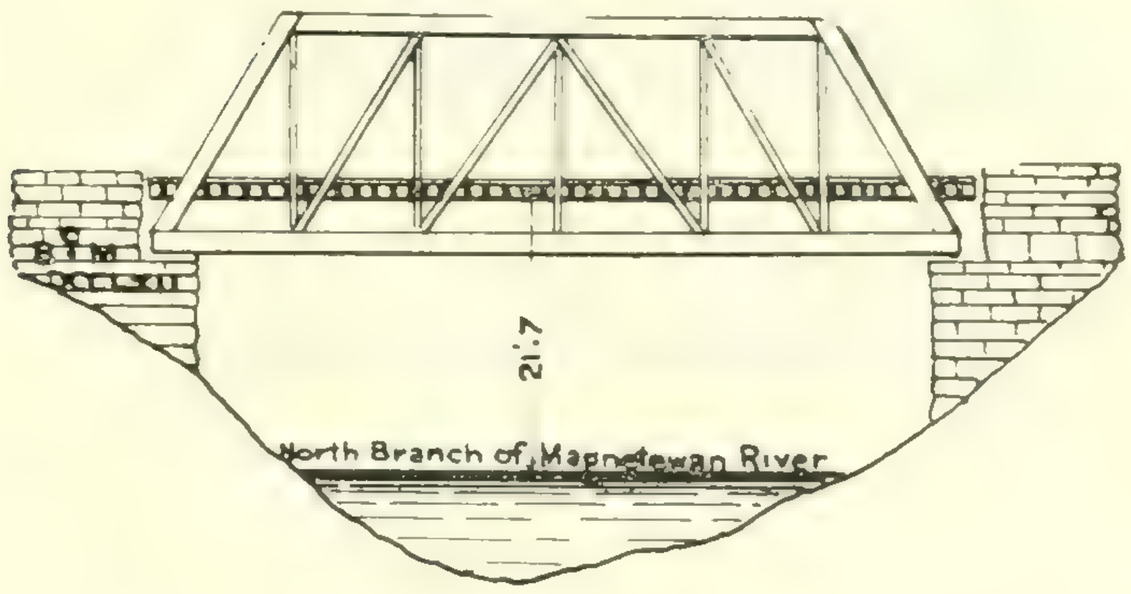
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCLXVII.	Chisel line in end of copper plug driven horizontally in 4th course from top, east face of north abutment of G.T.R. bridge over south branch of Magnetewan river.....	981·23	981·39

Katrine.



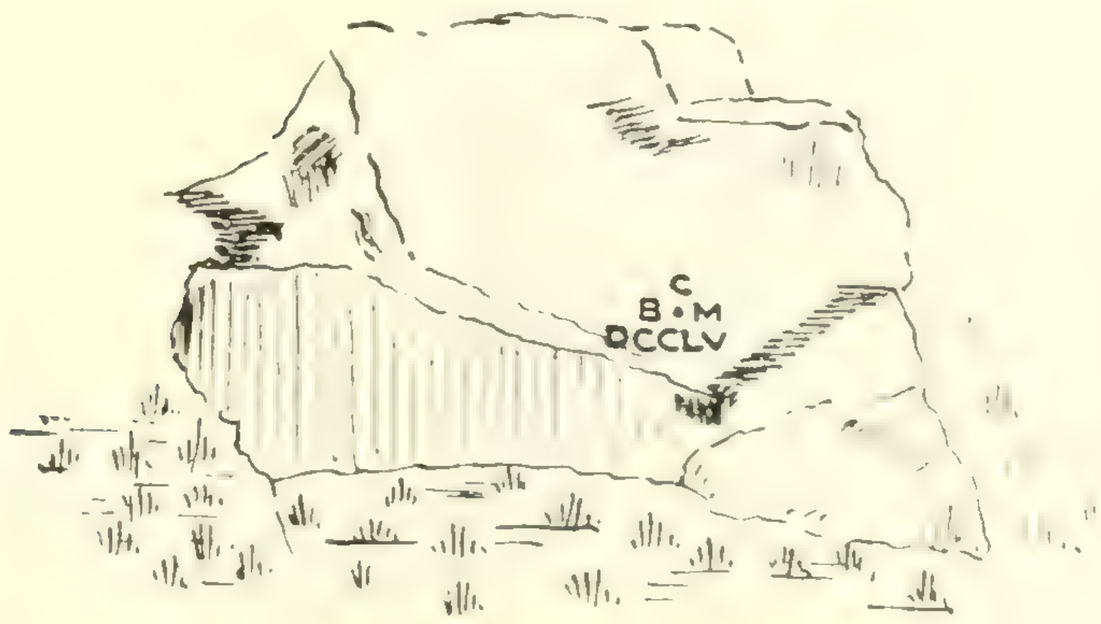
DCCLXII.	Chisel line in end of copper plug driven horizontally in 6th course from top, north end of west face of north abutment of G.T.R bridge over Magnetewan river.....	978·57	978·71

Buck's Falls.



DCCLV	Chisel line in end of copper plug, driven horizontally in east face of solid rock, 18·2 feet west of track and 435 feet north of mile post, 46–181.	1,094.57	1,094.69

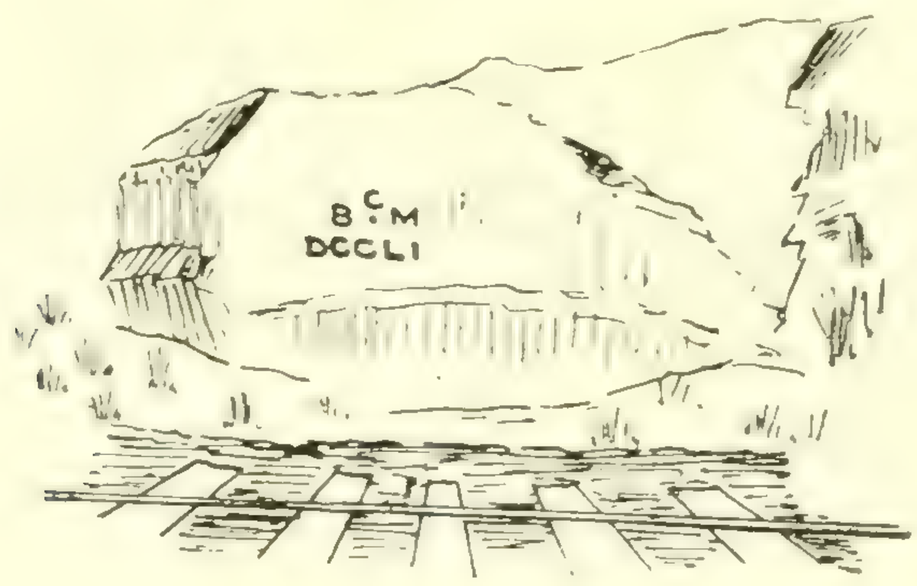
Sundridge.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

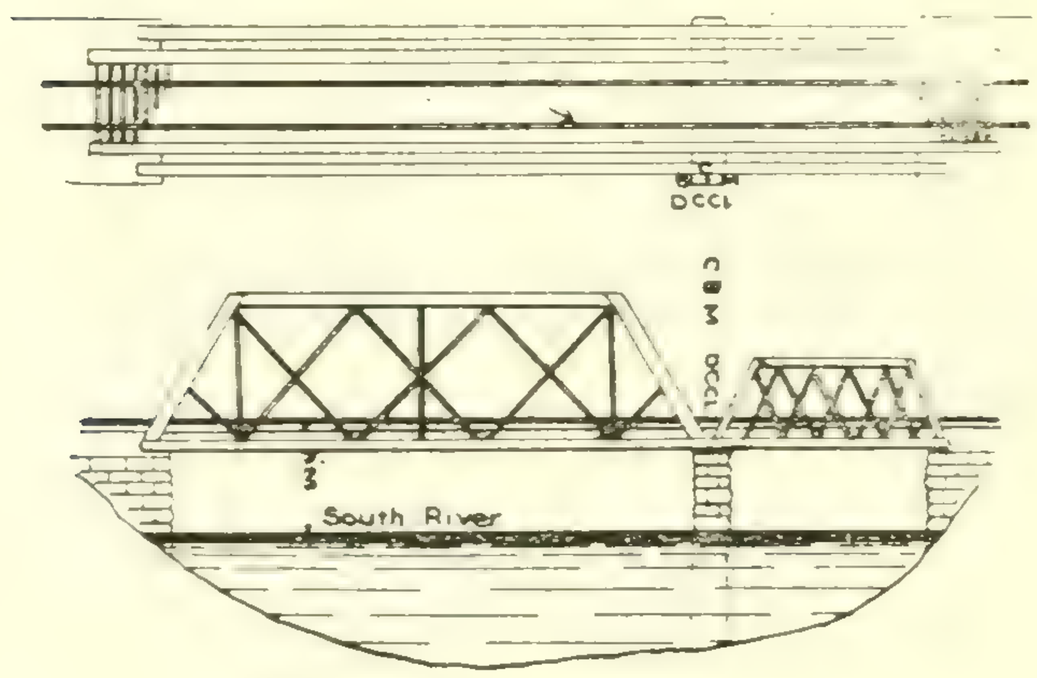
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCLI	Chisel line in end of copper plng, driven horizontally in solid rock, 8·25 feet west of track, 189 feet north of first semaphore north of station at.....	1,156.75	1,156.85

SOUTH RIVER.



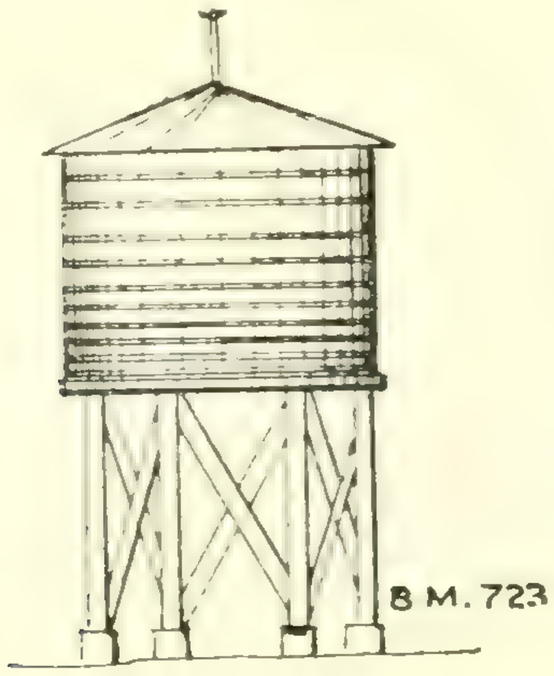
DCCL	Chisel line in end of copper plug, driven perpendicularly into north end of coping seat, east side of north abutment of G.T.R. bridge over South river.....	1,152.95	1,153.05

SOUTH RIVER.



723	Cross cut in southwest corner of steel covering of cement base first pillar from south front of watertank, 9·2 feet east track, and 50·4 feet northeast of mile post 200—27.....	1,027.30	1,027.37

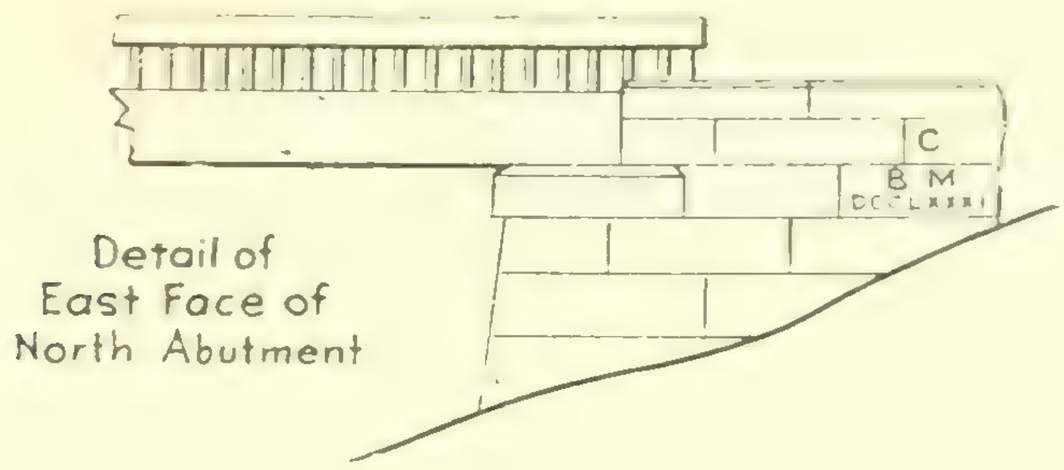
TROUT CREEK.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

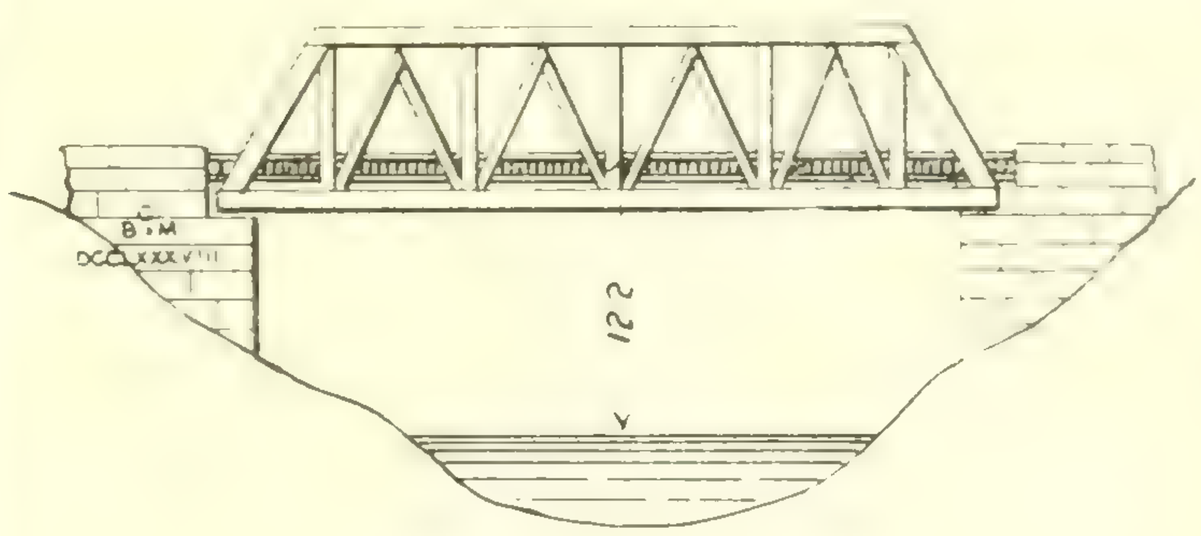
Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCCLXXXI	Chisel line in end of copper plug, driven horizontally in third course from top, east face of south abutment of G.T.R. bridge over McGuines brook.....	852.21	852.26

Powassan.



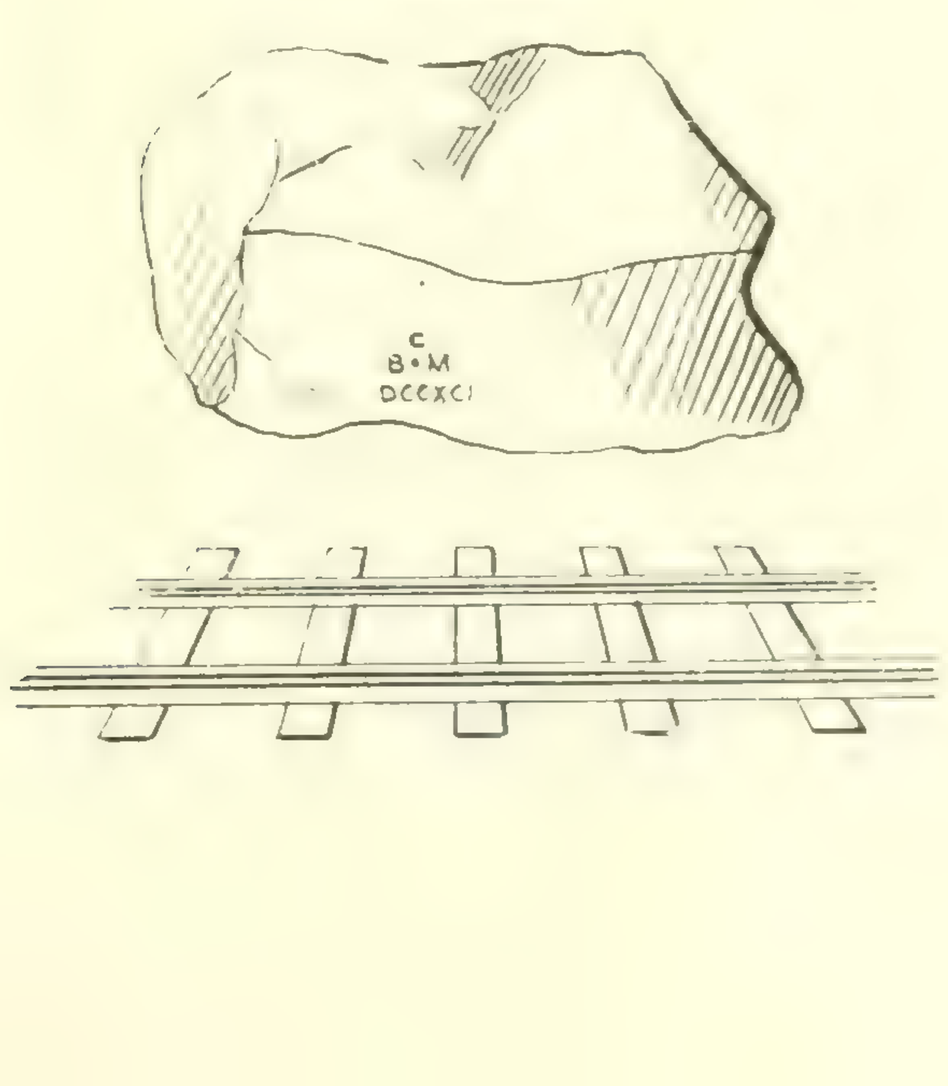
DCCLXXXVIII	Chisel line in end of copper plug, driven horizontally in fourth course from top, east face of south abutment of G.T.R. bridge over Wistawasing brook.....	739.51	739.54

Powassan.



DCCXCI	Chisel line in end of copper plug, driven horizontally in solid rock, 8·95 feet west of track, and 129 feet northwest of semaphore south of station of.....	675.88	675.90

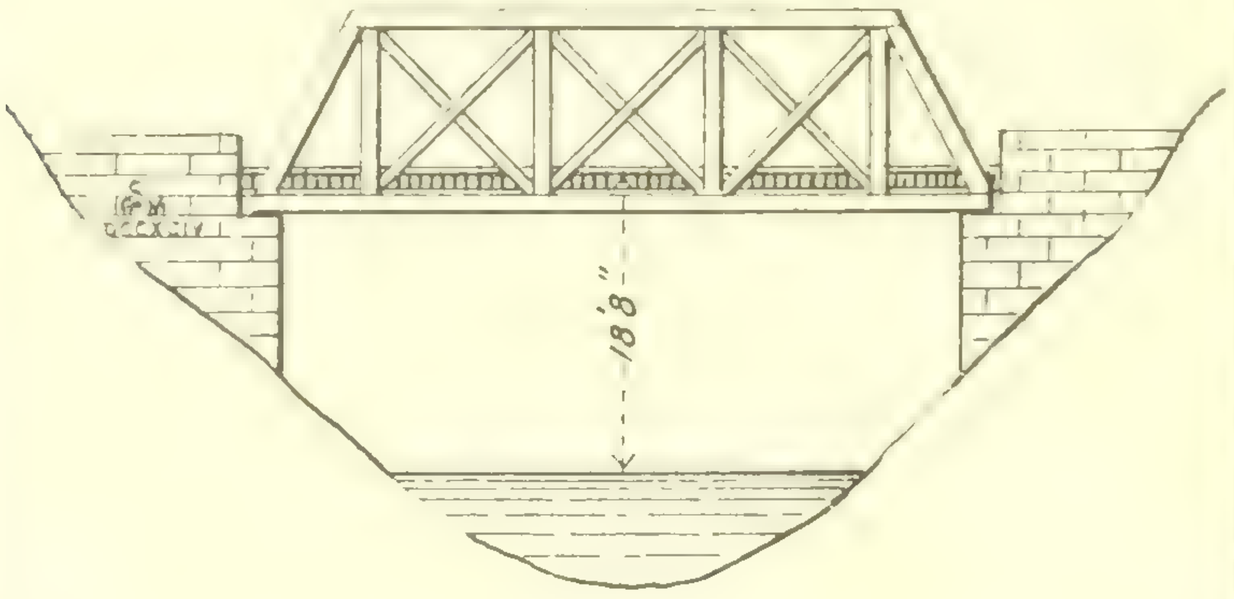
Callender.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

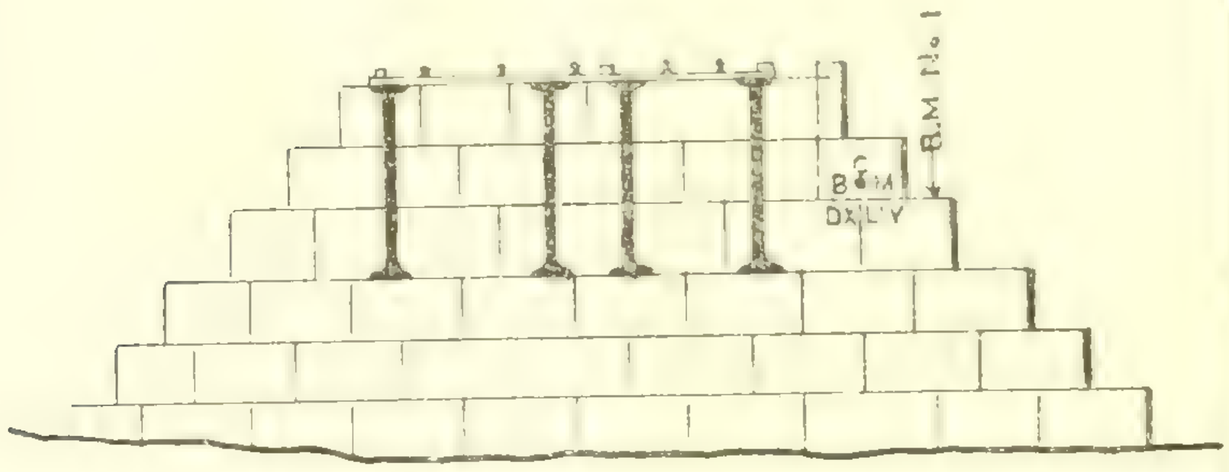
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCXCIV	Chisel line in end of copper plug, driven horizontally in third course from top, east face of south abutment of G.T.R. bridge over Rivière à la Vase	673.16	673.17

Nipissing Junction.



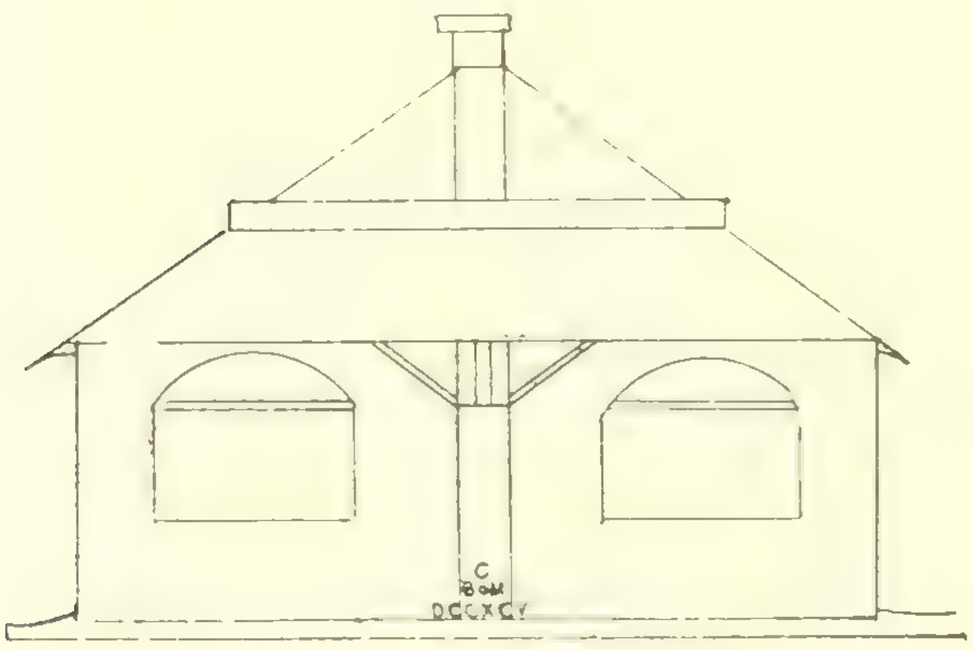
DXLIV	Chisel line in end of copper plug, driven horizontally in second course from top, west end of south abutment of bridge over Chippewa creek	650.71	650.71
	Inside edge of coping of fourth altar step, west end of south abutment of bridge over Chippewa creek	646.06	646.06

North Bay.



DCCXCVI	Chisel line in end of copper plug, driven horizontally in cut stone on east face of station at	663.19	663.19

North Bay.

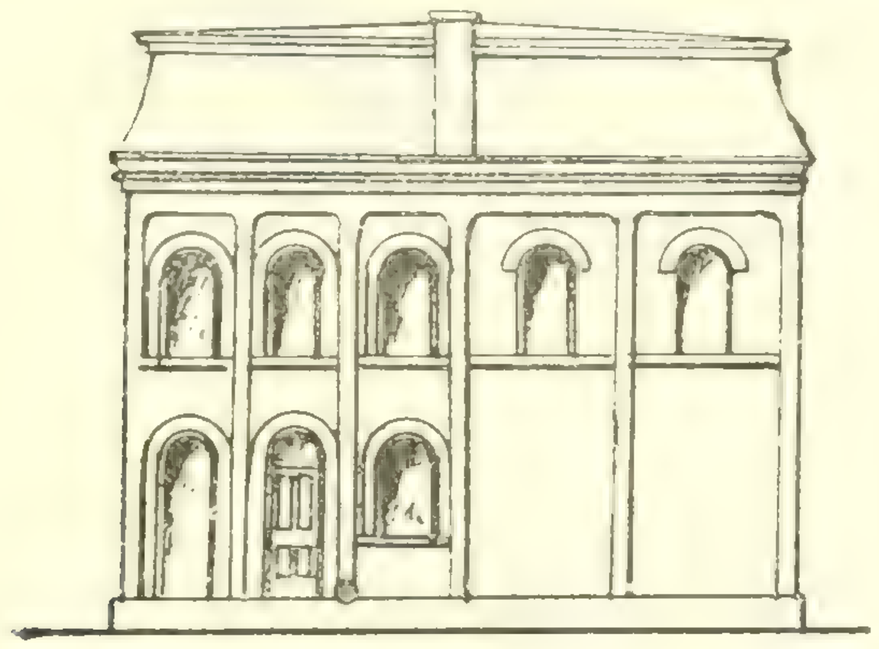
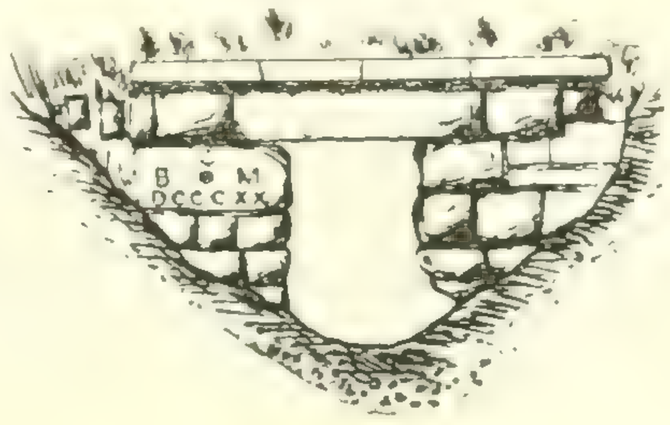


ROUSES' POINT TO MONTREAL.

VIA LACOLLE JC., HOWICK JC., VALLEYFIELD, COTEAU JC. AND LACHINE.

DESCRIPTIVE LIST OF MOST IMPORTANT PERMANENT BENCH MARKS.

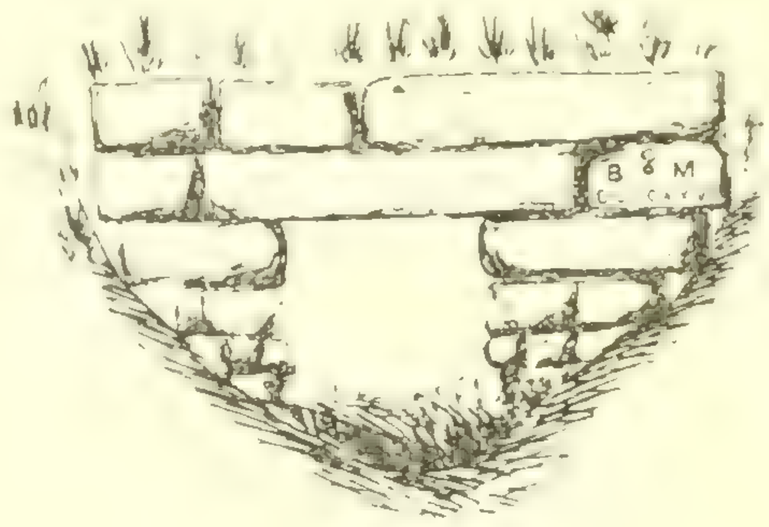
Datum: Mean Sea Level, Atlantic Ocean at New York.

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
B. M. +	+ Top of stone plinth, 20·6 feet from northeast corner, 1½ feet above ground, north end of the Chapman building, occupied by Wallace & Rosemyer.....	107.96	107.96
	ROUSES' POINT, N. Y.		
			
DCCCXX	Copper plug, driven horizontally nto third course from top east end of north face of small culvert north side of track	161.84	161.89
	LACOLLE, P. Q.		
			

Descriptive List of most Important Permanent Bench Marks—*Continued.*

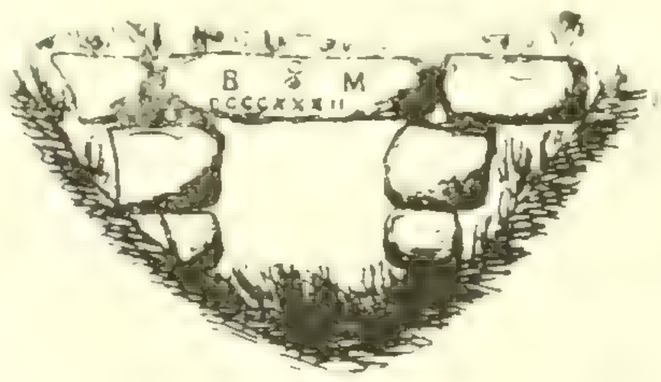
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCCXXXVII	Copper plug driven horizontally into second course from top, west end of north face of small culvert, 480 feet west of mile post 17	223.53	223.61

Henrysburg, P. Q.



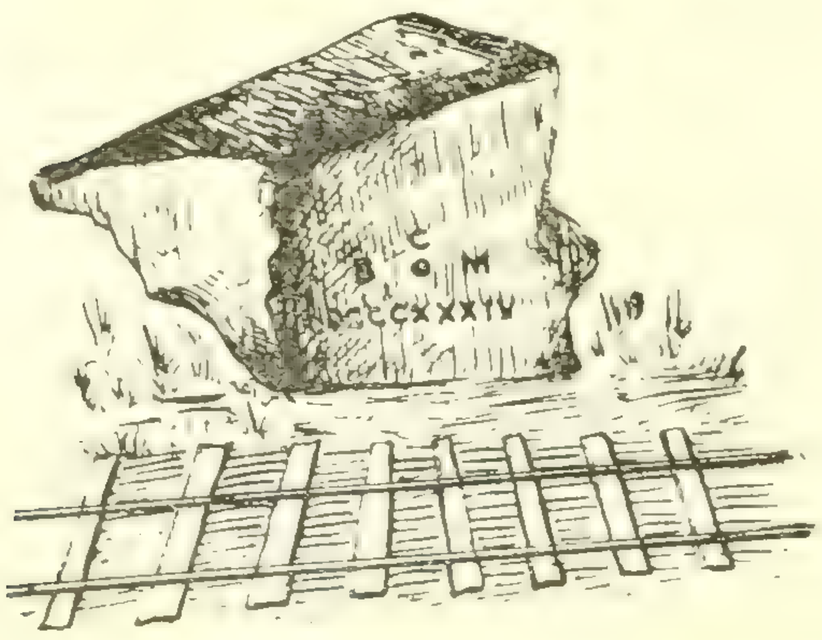
DCCCXXXII	Copper plug driven horizontally into centre of top stone, south face of small culvert, south side of track and 162 feet west of mile post 22	179.84	179.95

Johnson's, P. Q.



DCCCXXXIV	Copper plug driven horizontally into solid rock, 9 feet south of track and 81 feet west of mile post 26	195.08	195.21

Holton, P. Q.

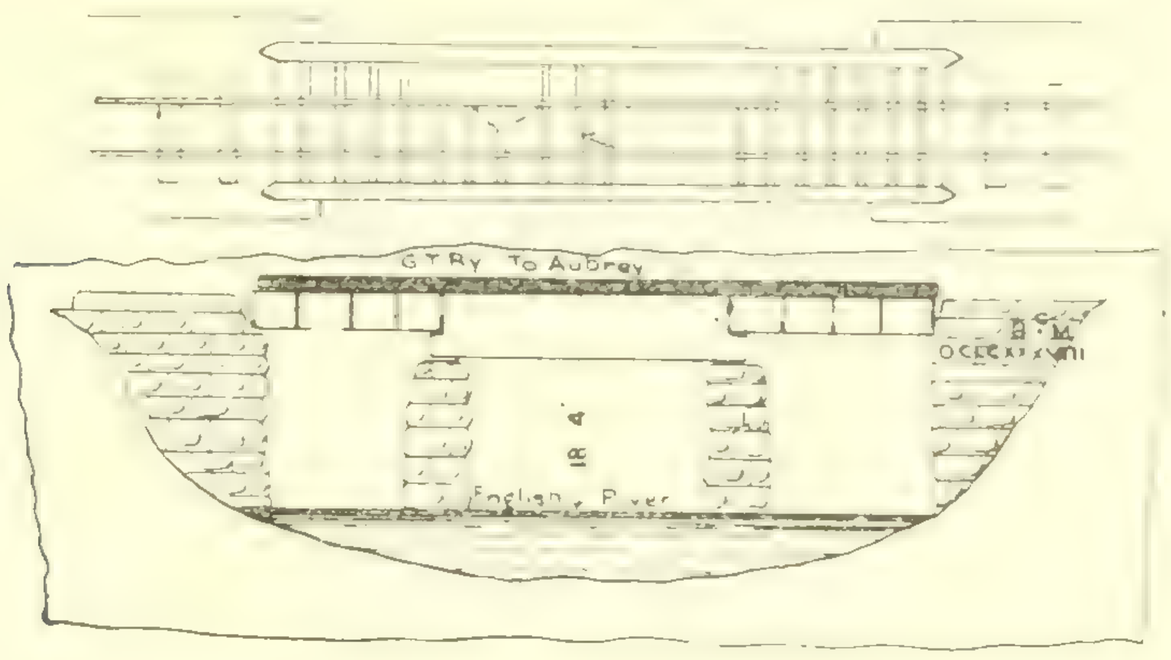


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

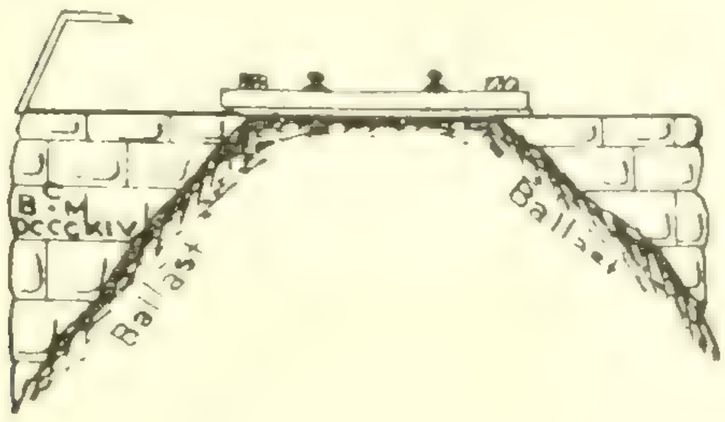
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCCXXXVIII	Copper plug driven horizontally into second course from top, south face of east abutment of G.T.R. bridge over Norton brook	138.00	138.16

Aubrey, P. Q.



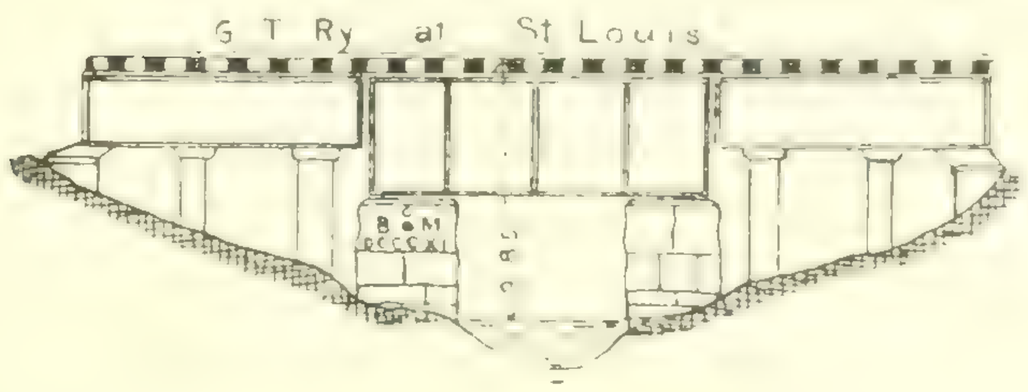
DCCCXIV	Copper plug driven horizontally into third course from top, west face of north end of west abutment of G.T.R. bridge over Chateauguay river	129.25	129.45

St. Louis, P. Q.



DCCCXI	Copper plug driven horizontally into first course from top, north face of north pier east end of G.T.R. bridge over St. Louis river	129.08	129.31

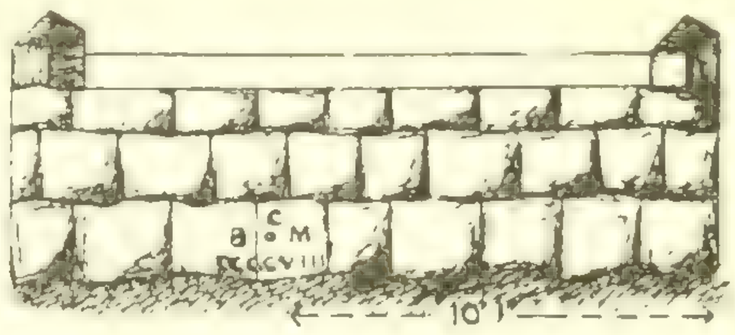
St. Louis, P. Q.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

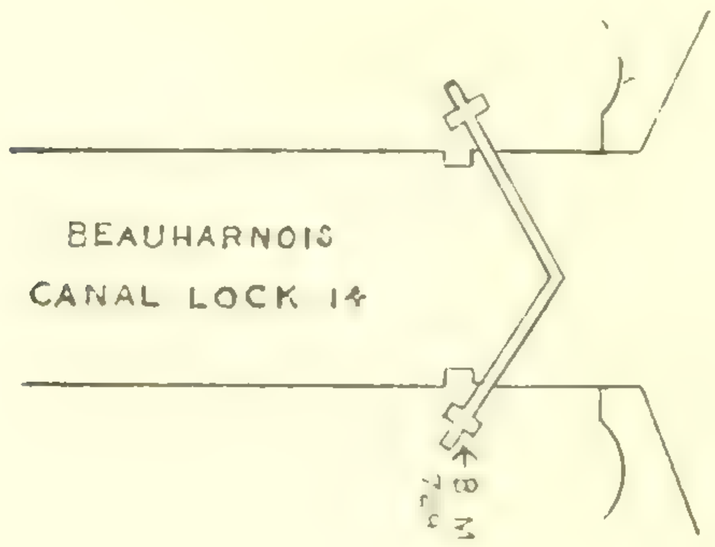
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCCVIII	Copper plug driven horizontally into base course, centre of south face of sluice portal, north side of Beauharnois canal, 1¼ miles east of lock 1.....	143.44	143.71

Valleyfield P. Q.



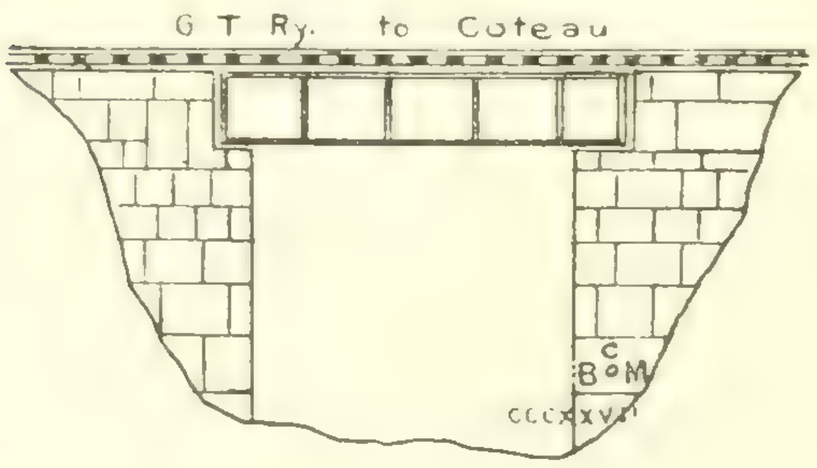
729	+ Cross cut on strap 6 inches from heel post, north end of upper gates of lock 14 of Beauharnois canal.....	154.29	154.57

Valleyfield P. Q.



CCCCXXVIII	Copper plug driven horizontally into base of east face of north abutment of overhead crossing of road along north side of canal	160.85	161.17

Soulanges, P. Q.

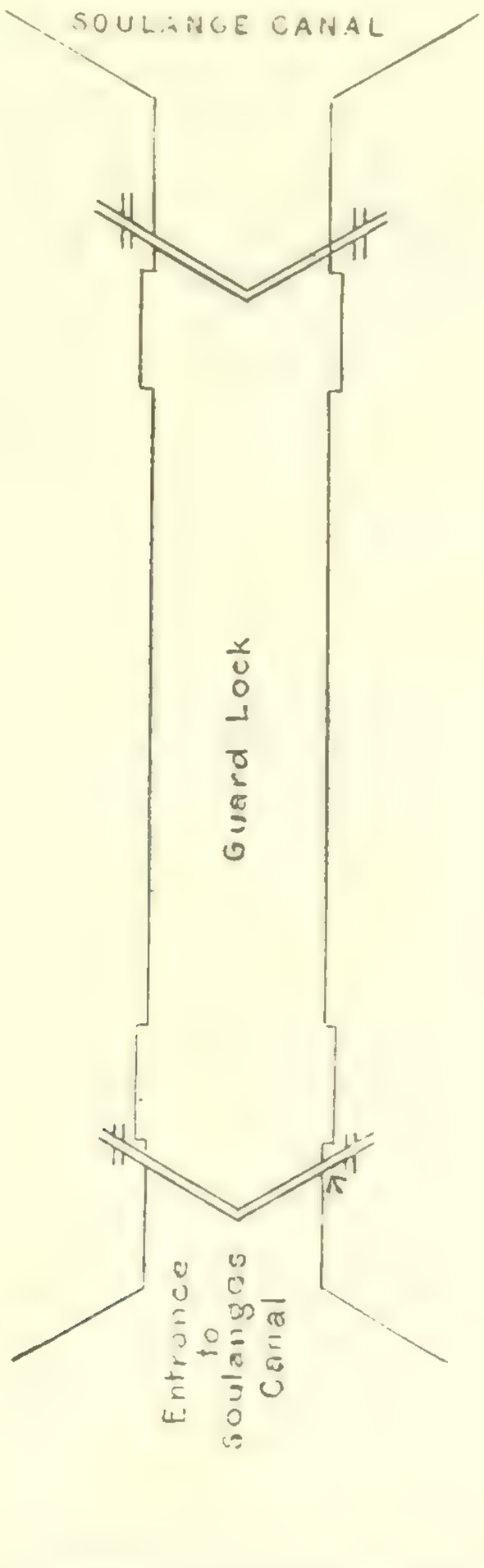


SESSIONAL PAPER No. 19a

DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

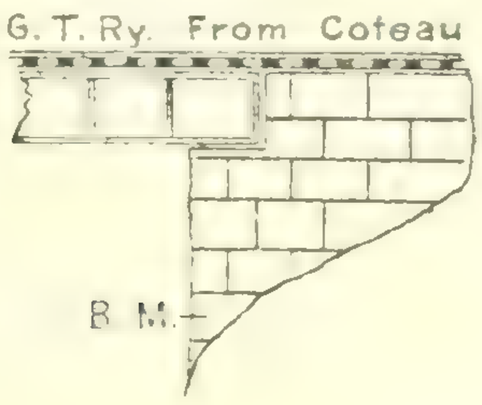
Bench Marks.	Description and Location.	Elevations	
		Instrumental.	Adjusted.
S.W. coping.	Coping 6 inches from heel post south end of upper gates of lock 1, Soulanges canal.....	157.99	158.30

SOULANGES, P. Q.



47	Iron bolt driven horizontally into southwest corner of north face of south abutment of G.T.R. overhead crossing of road along south side of Soulanges canal.....	160.99	161.30

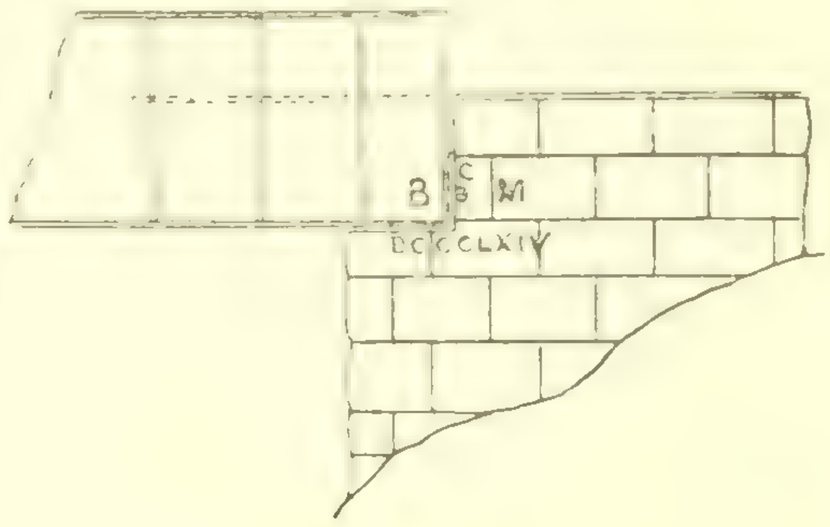
SOULANGES P. Q.



Descriptive List of most Important Permanent Bench Marks—*Continued.*

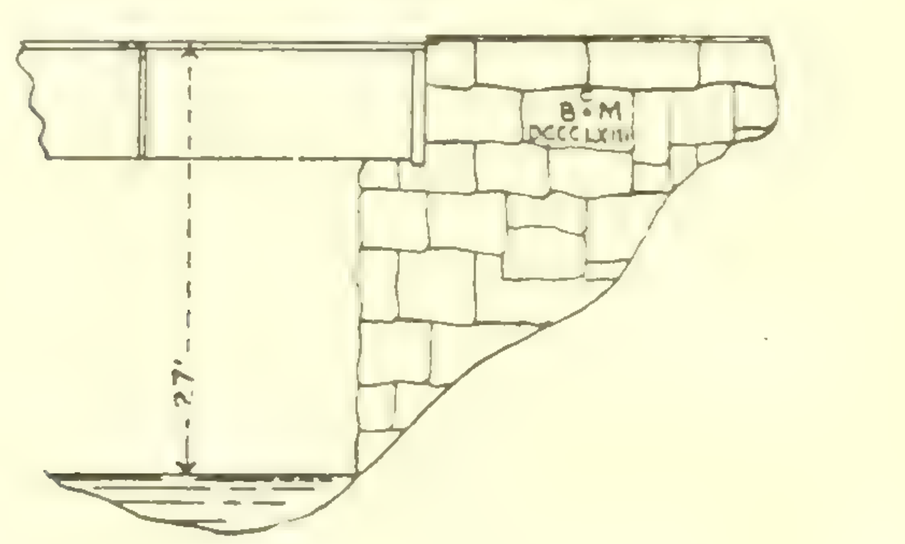
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCCLXIV	Copper plug driven horizontally into top course, west face of down stream end of east abutment of G.T.R. bridge over Delisle river	158.83	159.14

Coteau P. Q.



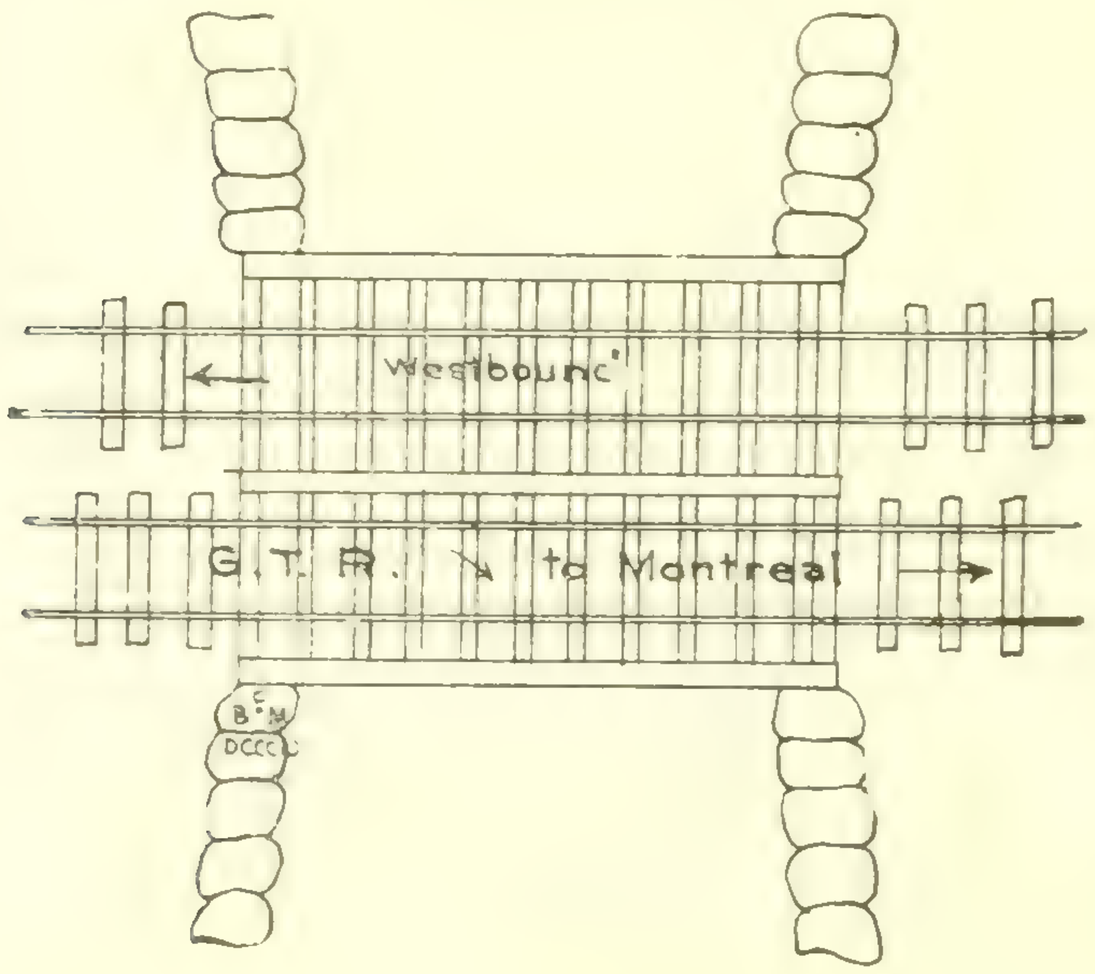
DCCCLXIII	Copper plug driven horizontally into second course from top, centre of up stream face of west abutment of G.T.R. bridge over Riviere Rouge	157.74	158.05

Rivière Rouge, P. Q.



DCCCLX.	Copper plug driven horizontally into lower stone of south face of first altar step of west ballast wall of beam culvert, 784 feet west of mile post 31½ from Montreal	149.59	149.91

St. Dominique, P. Q.

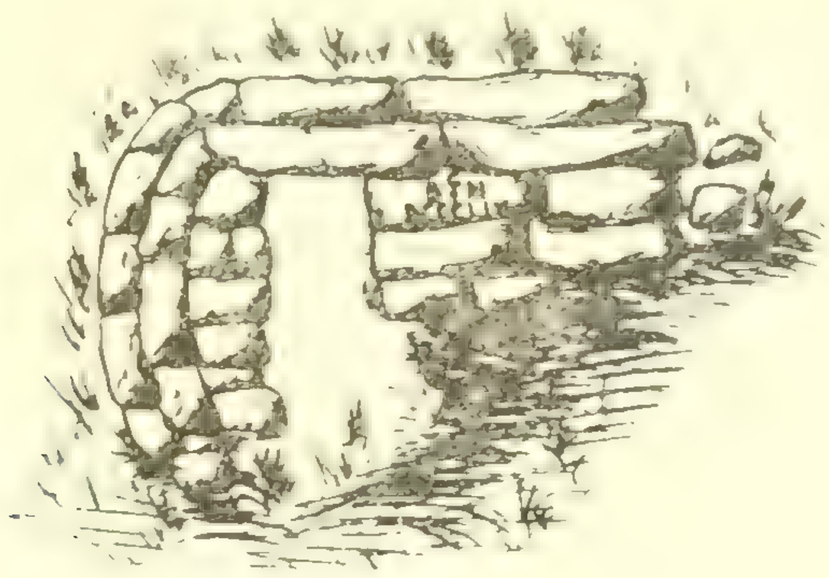


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCCCLIX	Copper plug driven horizontally into third course from top, west end of north face of G.T.R. culvert, 193 feet east of mile post, 26¾ miles from Montreal	118.77	119.10

Cedars, P. Q.

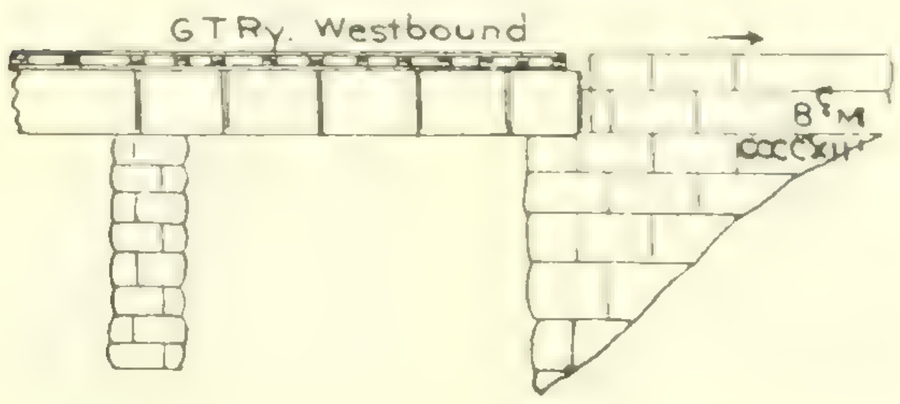


CCCCXV.	Copper plug driven horizontally into west face of top course, south end of west abutment of G.T.R. bridge over Ottawa river	88.30	88.61

Vaudreuil, P. Q.

CCCCXIII	Copper plug driven horizontally into second course from top, west end of north face of west abutment of G.T.R. bridge over channel east end of Ile Perrot	92.01	92.33

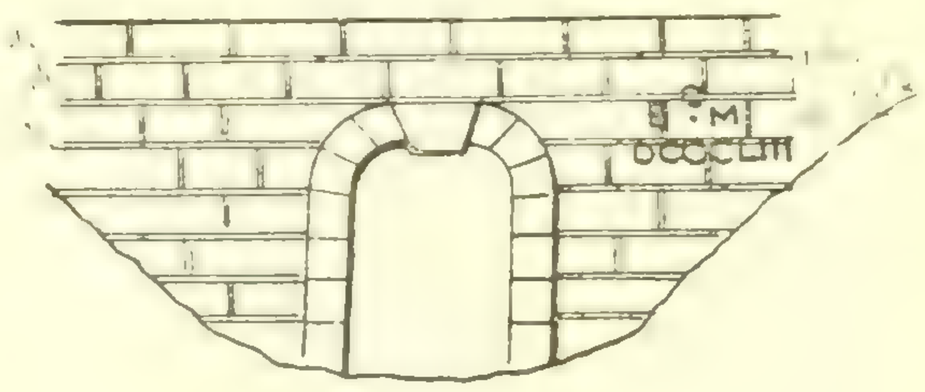
Ile Perrot, P. Q.



DESCRIPTIVE List of most Important Permanent Bench Marks—*Continued.*

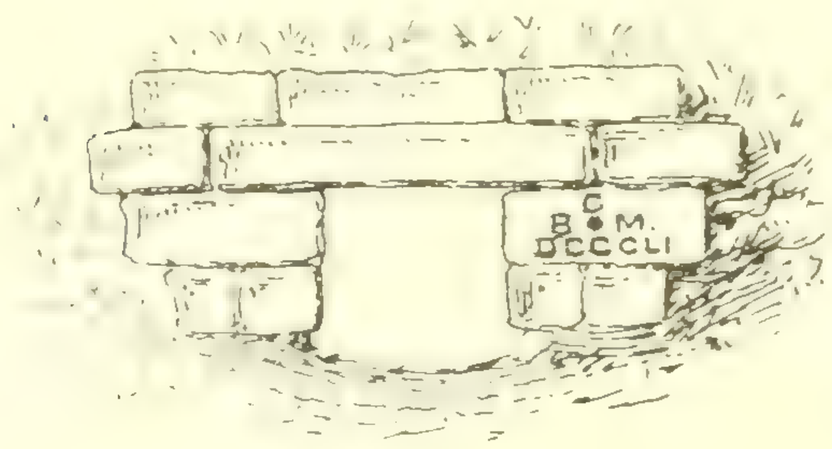
Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
DCCCLIII.	Copper plug driven horizontally into third course from top, east end of south face of C.P.R. arched culvert, opposite G.T.R. mile post 17.....	83.66	83.98

BEAUREPAIRE, P. Q.



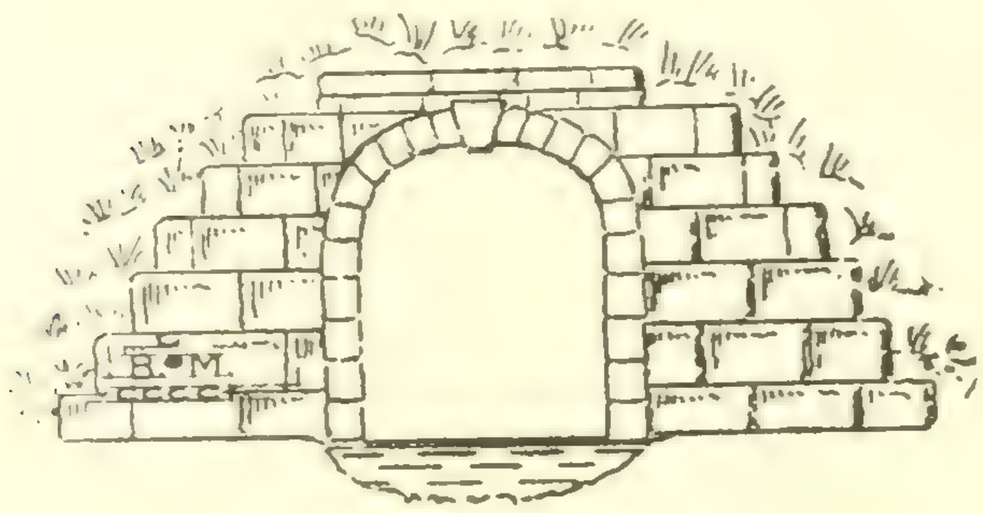
DCCCLI.	Copper plug driven horizontally into third course from top east end of north face of G.T.R. culvert 745 feet south of mile post 15.....	96.62	96.93

BEACONSFIELD, P. Q.



CCCCI.	Copper plug driven horizontally into second course from bottom, south end of west ballast wall of arched culvert, south side of G.T.R., and 220 feet west of Valois station.....	73.86	74.16

VALOIS, P. Q



SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
CCCXCVIII.	Copper plug driven horizontally into first cut stone above ground, one foot from rear end of west face of Dorval R. C. church..	93.55	93.85

Dorval, P. Q.

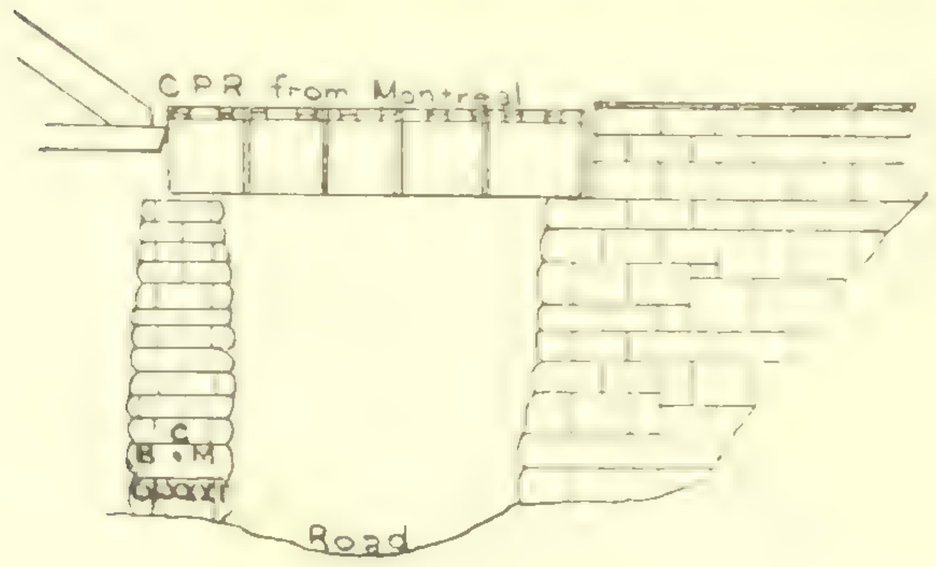
CCCXCVI.	Copper plug driven horizontally into first cut stone above ground, southeast corner of double stone house, second west of 34th avenue, along Lachine road.....	79.20	79.49

Lachine Wharf, P. Q.

Descriptive List of most Important Permanent Bench Marks—*Continued.*

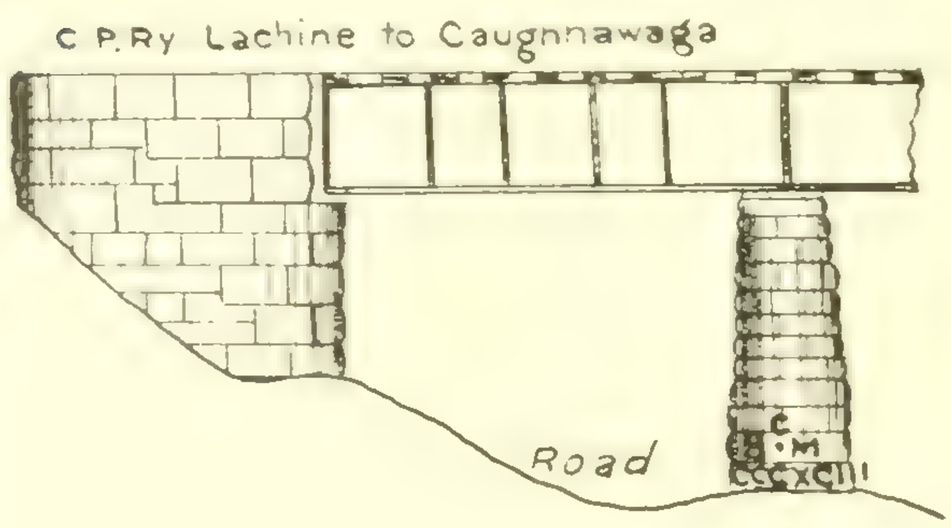
Bench Mark.	Description and Location.	Elevations. Instrumental.	Adjusted.
DLXXXI.	Copper plug driven horizontally into second course above ground, west face of pier, 15 feet, south of south side of Lachine canal (C.P.R. swing bridge).....	74.53	74.81

Lachine, P. Q.



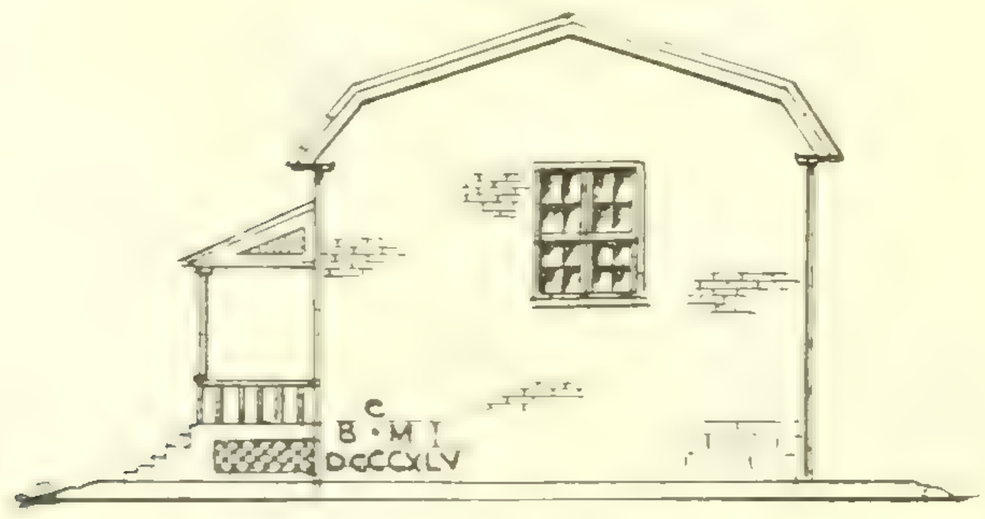
CCCXCIII	Copper plug driven horizontally into second course above ground, southwest face of first pier, Lachine end of C.P.R. bridge over St. Lawrence river.....	93.85	94.13

Lachine, P. Q.



DCCCXLV.	Copper plug driven horizontally into stone foundation, 18 inches from front, south gable of John Duffy's brick cottage, 18·7 feet north of track, east side of St. Philippe street.....	63.86	64.12

St. Henri, P. Q.

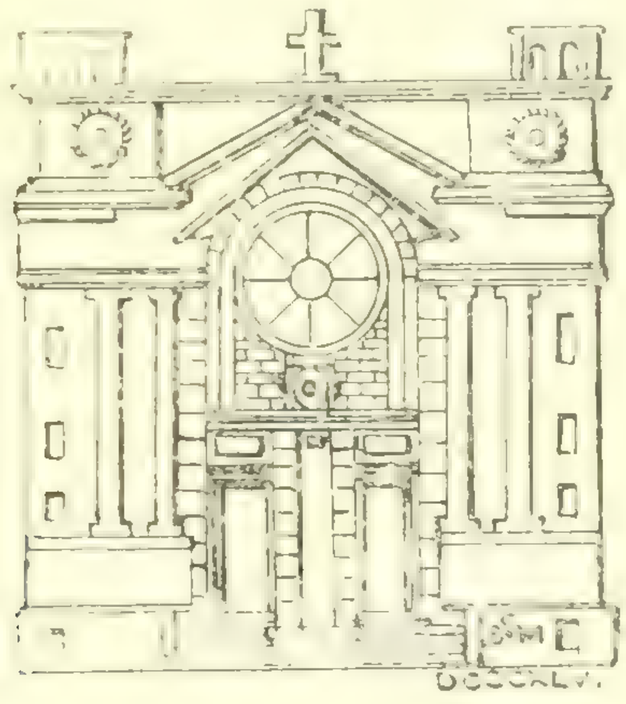


SESSIONAL PAPER No. 19a

Descriptive List of most Important Permanent Bench Marks—*Continued.*

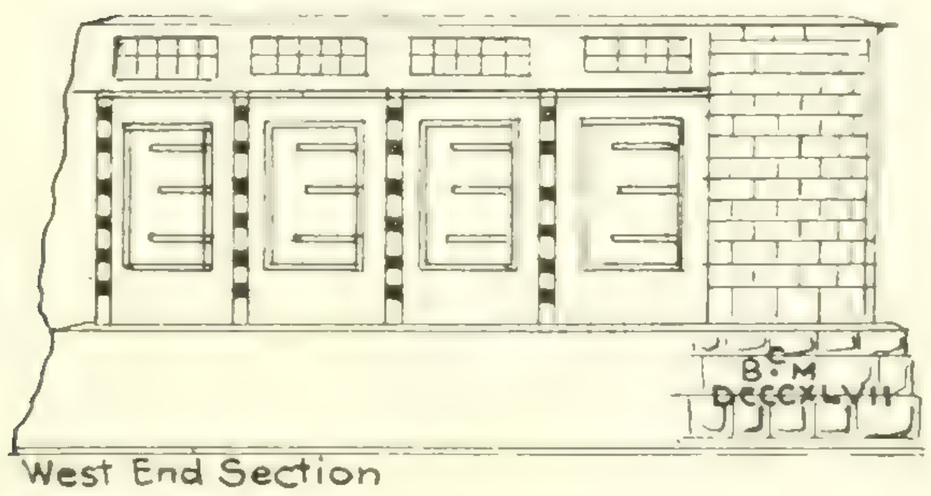
Permanent Marks.	Description and Location.	Elevations. Instrumental.	Elevations. Adjusted.
DCCCXLVI.	Copper plug driven horizontally into second course above ground, 14·85 feet from east end of stone front of St. Cunégonde R. C. church.....	55.54	55.80

Montreal, P. Q.



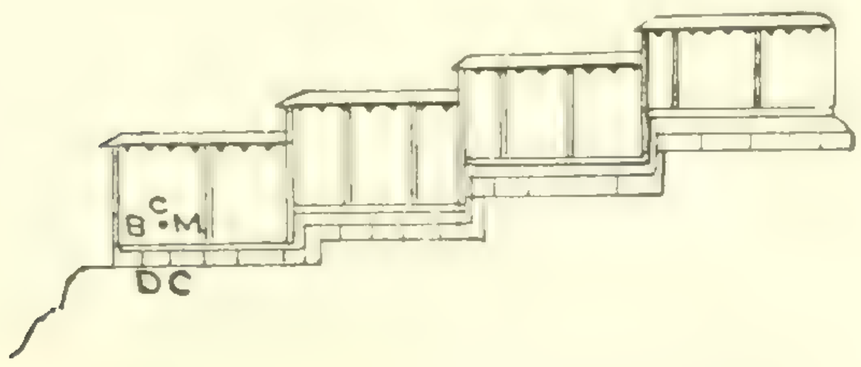
DCCCXLVII	Copper plug driven horizontally into second course above ground, 6.6. feet from west end of north face of G.T.R. freight shed nearest to tracks, at Mountain street crossing.....	46.69	46.95

Montreal, P. Q.



DC.	Copper plug driven horizontally into base, south face of west end of guard wall, south abutment of Curran bridge over Lachine canal at Wellington street.....	54.66	54.90

Montreal, P. Q.



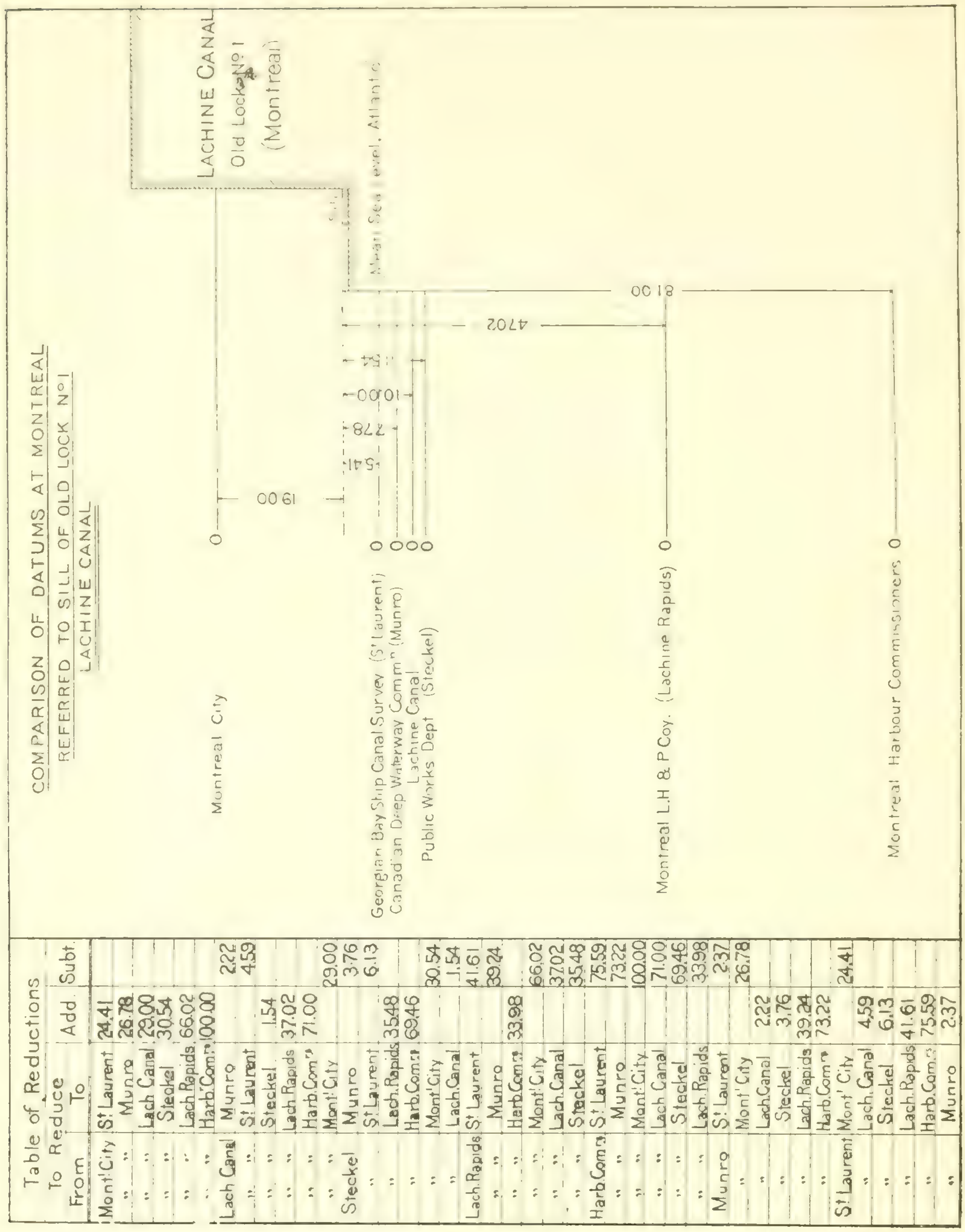


Table of Reductions			
From	To	Add.	Subt.
Mont'l City	St Laurent	24.41	
" "	Munro	26.78	
" "	Lach Canal	29.00	
" "	Steckel	30.54	
" "	Lach. Rapids	66.02	
" "	Harb. Com"	100.00	
Lach Canal	Munro		2.22
" "	St Laurent		4.59
" "	Steckel	1.54	
" "	Lach Rapids	37.02	
" "	Harb. Com"	71.00	
" "	Mont'l City		29.00
Steckel	Munro		3.76
"	St Laurent		6.13
"	Lach. Rapids	35.48	
"	Harb. Com"	69.46	
"	Mont'l City		30.54
"	Lach. Canal		1.54
Lach. Rapids	St Laurent		41.61
" "	Munro		39.24
" "	Harb. Com"	33.98	
" "	Mont'l City		66.02
" "	Lach. Canal		37.02
" "	Steckel		35.48
Harb. Com"	St Laurent		75.59
" "	Munro		73.22
" "	Mont'l City		100.00
" "	Lach Canal		71.00
" "	Steckel		69.46
" "	Lach. Rapids		33.98
Munro	St Laurent		2.37
"	Mont'l City		26.78
"	Lach. Canal	2.22	
"	Steckel	3.76	
"	Lach. Rapids	39.24	
"	Harb. Com"	73.22	
St Laurent	Mont'l City		24.41
"	Lach. Canal	4.59	
"	Steckel	6.13	
"	Lach. Rapids	41.61	
"	Harb. Com"	75.59	
"	Munro	2.37	

ELEVATION of Sill of Old Lock No. 1, Lachine canal, Montreal, based on the difference of Elevations of certain Bench Marks, common to the Public Works Department's system of levels (Steckel's) and the Georgian Bay Ship Canal Survey's system of levels (St. Laurent.)

Bench Marks.	Steckel's.	St. Laurent's.	Difference.
S.E. cor. Montreal Custom House	55.1614	49.03	6.1314
S.E. cor. Examining Warehouse, Montreal	55.0998	48.98	6.1198
S.W. face, abutment, C.P.R. bridge, Lachine	99.9894	93.85	6.1394
Lachine R.C. Church	88.9787	82.87	6.1087
B.M. CXLI, St. Lambert	55.54	49.38	6.1600
B ⊕ M, Brock street bridge, Montreal	47.4196	41.27	6.1496
			36.8089
Mean Difference			6.1348
Elevation of Sill, Old Lock No. 1, (Steckel)			11.54
Difference of Elevation of Datums (Steckel--St. Laurent)			6.13
Elevation of Sill Old Lock No. 1 (St. Laurent)			5.41

PRECISE LEVELLING.

ROUSES' POINT TO CORNWALL VIA ST. JOHN, VICTORIA BRIDGE, LACHINE, VAUDREUIL AND COTEAU LANDING.

COMPLETE LIST OF BENCH MARKS AND ELEVATIONS, DATUM, MEAN SEA LEVEL, ATLANTIC OCEAN AT NEW YORK.

Bench Marks.	Description and Location.	Elevations.	
		Instrumental.	Adjusted.
+	20·6 feet from N.E. corner of Chapman building, Rouses' Point, New York	107·96	107·96
	Base of rail, D. & H. Ry., at Chapman St. crossing, Rouses' Point	129·25	129·25
	Base of rail, D. & H. Ry., Spratt St.	123·15	123·15
	Base of rail, D. & H. Ry., Rouses' Point station	122·48	122·48
DCI.	On N.E. corner of D. & H. Ry station, Rouses' Point	123·75	123·76
	Base of rail, D. & H. Ry., at crossing of Rutland Ry	120·31	120·31
639	+ On boulder at boundary line, U.S.A. and Canada	113·39	113·41
	Base of D. & H. Ry., rail at boundary line, U.S.A. and Canada.	116·37	116·39
B.W. 'A.'	Top of bronze cap of bench wall 'A' in boundary line	93·60	93·63
B.W. 'A.'	Cavity in bronze cap of bench wall 'A' in boundary line	93·56	93·59
B.W. 'A.'	Top of inside tube of bench wall 'A' in boundary line	101·55	101·59
B.W. 'A.'	Top of outside tube of bench wall 'A' in boundary line	102·68	102·72
DCII.	In W. face of S. abutment of G.T.R. culvert, Lacolle, P.Q.	109 28	109·31
	Base of G.T.R. rail, centre of G.T.R. culvert, Lacolle	113·57	113·59
	Base of G.T.R. rail at road crossing, Lacolle	117·33	117·35
	Base of G.T.R. rail at crossing of branch to Ottawa	130·42	130·45
	Base of G.T.R. rail at road crossing, Lacolle, P.Q.	131·12	131·15
	Base of G.T.R. rail at old G.T.R. station, Lacolle, P.Q.	131·99	132·02
	Base of G.T.R. rail, centre of bridge, over Lacolle river	131·84	131·87
DCIII.	On W. end of N. abutment of bridge over Lacolle river	129·92	129·95
640	+ On W. end of N. abutment of bridge over Lacolle river	132·17	132·20
641	+ On W. end of N. abutment of bridge over Lacolle river	132·06	132·09
	Base of G.T.R. rail, at road crossing, Lacolle, P.Q.	134·64	134·67
	Base of G.T.R. rail, at road crossing, Lacolle, P.Q.	145·88	145·92
	Base of G.T.R. rail, at road crossing, Lacolle, P.Q.	141·07	141·11
DCIV.	On E. end of N. abutment of G.T.R. culvert, Lacolle	137·06	137·10
	Base of G.T.R. rail, centre of G.T.R. culvert, Lacolle	139·51	139·55
	Base of G.T.R. rail at road crossing culvert, Lacolle	139·26	139·30
IX.	On N.E. corner of L. Goudreau's house, Lacolle	128·61	128·65
	Base of G.T.R. rail, at road crossing, Stottsville, P.Q.	161·74	161·79
	Base of G.T.R. rail at St. Valentin de Stottsville station	150·06	150·12
DCV.	On S. side of Stottsville R.C. church	157·44	157·50
DCVI.	On E. end of S. abutment of G.T.R. culvert, Stottsville	146·41	146·47
	Base of G.T.R. rail, centre of G.T.R. culvert, Stottsville	149·85	149·91
642	+ At S.E. corner of G.T.R. culvert, Stottsville	145·79	145·85
VIII.	On S. gable of C. Boudreault's house, St. Paul	105·80	105·87
DCXIII.	On front of St. Paul de l'Ile aux Noix R.C. church	109·54	109·61
B.W. 'B.'	Top of bronze cap of bench well 'B,' St. Paul	97·04	97·11
B.W. 'B.'	Cavity in bronze cap of bench well 'B,' St. Paul	97·03	97·10
B.W. 'B.'	Base of G.T.R. rail at road crossing, Stottsville	158·13	158·19
DCXVII.	On S.E. corner of G.T.R. arched culvert, Stottsville	150·41	150·48
643	+ On S.E. corner of G.T.R. arched culvert	149·82	149·89
	Base of G.T.R. rail at road crossing, Stottsville	160·18	160·25
	Base of G.T.R. rail at Girard station	152·20	152·28
	Base of G.T.R. rail at Girard station crossing	151·96	152·04
644	+ On boulder 24 feet E. of track, opposite Girard's house	149·09	149·17
	Base of G.T.R. rail at road crossing	144·81	144·90
	Base of G.T.R. rail at Grande Ligne station	141·72	141·81
	Base of G.T.R. rail at Grande Ligne crossing	141·58	141·67
DCVIII.	On N.W. corner of Grande Ligne station	141·74	141·83
DCIX.	On stone front of St. Blaise de Grande Ligne R.C. church	141·69	141·78
VI.	On W. gable of M. Robert's house foot of Grande Ligne road.	107·58	107·68
V.A.	On N. wall of Lucien Menard's house, St. Johns	117·81	117·93
IV.	On N. gable of F. Pinsonnault's house, St. Johns	110·76	110·89
DCX.	On N.E. corner of G.T.R. culvert, St. Johns	119·28	119·40
	Base of G.T.R. rail, centre of culvert, St. Johns	124·58	124·70

ROUSES' Point to Cornwall, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Description.	Elevations.	
		Instrumental.	Adjusted.
DCXI.	On S.W. corner of G.T.R. culvert, St. Johns	104·66	104·78
	Base of G.T.R. rail, centre of culvert, St. Johns	107·57	107·69
	Base of G.T.R. rail at road crossing, St. Johns	105·11	105·23
DCXII.	On N. base of G.T.R. tank, St. Johns	124·73	124·85
B.W. 'C.'	Top of bronze cap of bench well 'C.' St. Johns	101·76	101·89
	Cavity in bronze cap of bench well 'C.'	101·74	101·87
	Base of G.T.R. rail, W. side of St. Johns station	120·63	120·75
	Base of G.T.R. rail, E. side of St. Johns station	120·20	120·32
III.	On S. gable of Montgomery's house, St. Johns	116·80	116·92
DXCVII.	On W. curved wall of lock 1, St. Johns	96·45	96·59
I.	On N.E. corner of T. Nolin's house, St. Johns	106·27	106·41
633	+On granolithic pavement, N.W. end of G.T.R. station	121·57	121·69
	Base of G.T.R. rail, crossing of St. John street	117·38	117·51
	Base of G.T.R. rail, crossing of Bernier St	110·48	110·61
	Base of C.P.R. rail at St. Johns station	116·36	116·50
	Base of G.T.R. rail at C.P.R. crossing, St. Johns	113·97	114·10
	Base of G.T.R. rail, centre of culvert 423 feet N. of mile 26	114·63	114·76
DXCVI.	On E. end of S. wall, culvert 423 feet N. of mile 26	107·37	107·50
	Base of rail crossing 400 feet N. of mile 24½	131·90	132·04
	Base of rail centre of culvert 575 feet N. of mile 22	126·73	126·88
DXCV.	On S. end of N. abutment culvert 575 feet N. of mile 22	120·67	120·82
	Base of rail crossing 625 feet N. of mile 22	126·80	126·95
	Base of rail centre of culvert 565 feet S. of mile 21	123·23	123·38
DXCIV.	On W. end of N. wall of culvert 565 feet S. of mile 21	118·38	118·53
	Base of G.T.R. rail, Lacadie station	116·87	117·03
	Base of G.T.R. rail, Lacadie station crossing	116·76	116·92
	Base of G.T.R. rail, centre of bridge over Lacadie river	116·17	116·33
DXCIII.	On W. end of N. abutment, bridge over Lacadie river	110·37	110·53
	Base of G.T.R. rail, crossing 445 feet S. of mile 19½	120·22	120·38
	Base of G.T.R. rail, culvert 280 feet N. of mile 17½	109·10	109·27
DXCII.	On E. end of S. wall, culvert 280 feet N. of mile 17½	104·13	104·30
	Base of rail crossing, 850 feet N. of mile 17	94·10	94·27
	Base of rail crossing, 1,000 feet N. of mile 16	77·03	77·21
	Base of rail, centre of culvert, 875 feet S. of mile 14	54·26	54·45
DXCI.	On E. end of S. wall, culvert 875 feet S. of mile 14	49·38	49·57
	Base of G.T.R. rail, centre of culvert, 216 feet N. of mile 13½	51·19	51·38
DXC.	On W. end of N. abutment of culvert, 216 feet N. of mile 13½	44·29	44·48
	Base of rail, centre of culvert, 1,570 feet N. of mile 13	51·48	51·68
DLXXXIX.	On E. abutment of culvert, 1,570 feet N. of mile 13	48·82	49·02
	Base of G.T.R. rail, at crossing, 1,335 feet S. of mile 12	53·11	53·31
	Base of G.T.R. rail at Brosseau station	59·05	59·25
	Base of G.T.R. rail at crossing, 1,320 feet E. of mile 11½	60·41	60·61
	Base of G.T.R. rail opposite B.M. DLXXXVIII, Brosseau	62·29	62·50
DLXXXVIII.	On E. end of S. wall of culvert, 1,125 feet N. of mile 10½	58·15	58·36
	Base of G.T.R. rail opposite B.M. DLXXXVII	61·75	61·96
DLXXXVII.	On W. end of S. wall of culvert, 270 feet S. of mile 9½, Brosseau	58·36	58·57
	Base of G.T.R. rail, opposite B.M. 632, St. Lambert	62·17	62·39
632	+On boulder 17 feet W. of track, 100 feet N. of mile 8	61·22	61·44
	Base of G.T.R. rail, centre of crossing Victoria St	69·20	69·43
DLXXXVI.	On W. abutment of G.T.R. crossing of Victoria street	71·96	72·19
	Base of G.T.R. rail at St. Lambert station	73·95	74·18
	Base of G.T.R. rail, centre of overhead crossing, Lapriarie Rd.	66·12	66·35
CXLI.	On W. wall of subway under G.T.R., Laprairie Rd	49·38	49·61
631	+On stone base of steel arch, St. Lambert end, Victoria bridge	68·38	68·61
DLXXXV.	On stone base of steel arch, St. Lambert end, Victoria bridge	67·55	67·78
630	On S. stone, first steel arch, entrance to Victoria bridge	67·97	68·21
L.	On S. end of E. face of Longueuil ferry subway	37·76	38·02
M.	On S. end of E. face of Beaudry St. subway	41·27	41·52
N.	On S.E. corner of Montreal Custom House	49·03	49·28
O.	On front of Montreal Examining Warehouse	48·98	49·23
638	+On coping E. side of old lock, Lachine Canal	36·94	37·19
637	On coping E. side of new lock, Lachine Canal	36·46	36·71
636	+On coping S. side of Windmill Pt. basin	41·97	42·22
635	+On coping S. side of Windmill Pt. basin	42·00	42·25
DLXXXIV.	On S. stone, first steel arch, entrance to Victoria bridge	67·18	67·42
	Base of G.T.R. rail at Pt. St. Charles station, Montreal	52·54	52·79
	Base of G.T.R. rail at Herbernia St. crossing, Montreal	49·85	50·10
	Base of G.T.R. rail at Charlevoix St. crossing, Montreal	51·76	52·01
	Floor level, centre of Curran bridge, Montreal	55·88	56·14
DC.	On W. end of S. abutment of Curran bridge, Montreal	54·63	54·90
634	+On E. end of S. coping of lock 3, Montreal	58·61	58·87
DCXIX.	On E. end of S. abutment of St. Gabriel bridge, Montreal	63·51	63·76
	Floor level of St. Gabriel St. bridge over canal, Montreal	63·58	63·84
DXCVIII.	On S. abutment of Brewster bridge over canal, Montreal	64·24	64·49
	Floor level of Brewster bridge over canal, Montreal	65·07	65·32
DLXXXIII.	On W. side of G.T.R. bridge over canal, Montreal	61·47	61·72
629	+On lower end of S. coping of lock 4, Montreal	67·58	67·84
DLXXXII.	On guard wall S. end of Cote St. Paul bridge, Montreal	72·74	73·00
628	+On guard wall S. end of Cote St. Paul bridge, Montreal	72·08	72·34

Rouses' Point to Cornwall, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Road level S. end of Cote St. Paul bridge, Montreal	71·76	72·02
627	+On boulder S. side of Lachine canal, Montreal	69·78	70·04
626	+On boulder S. side of Lachine canal. Montreal	71·23	71·50
625	+On boulder S. side of Lachine canal, Montreal	71·23	71·50
DLXXXI.	On W, side of S. pier of C.P.R. bridge over canal, Lachine	74·53	74·81
	Base of C.P.R. rail at Highlan ls station, Lachine	115·90	116·11
	Base of C.P.R. rail at overhead crossing, Lachine	121·92	122·18
CCCXCIII.	On W. side of first pier of C.P.R. bridge at Lachine	93·[illegible]5	94·13
	Lower Lachine roa l level opposite tollgate	75·37	75·62
535	+On coping of new lock 5, Lachine, P.Q.	74·42	74·71
536	+On coping of old lock 5, Lachine, P.Q.	74·43	74·72
CCCXCIV.	On E. en l of stone front of R.C. church, Lachine, P.Q.	82·87	83·16
CCCXCV.	On W. side of post office, Lachine, P.Q.	76·29	76·58
	Base of G.T.R. rail at Lachine wharf station	74·53	74·82
536½	Brass hea le l nail on Lachine wharf	72·04	72·33
	Base of G.T.R. rail at Lachine station	80·30	80·59
536¾	S.W. corner of G.T.R. culvert	85·47	85·77
	Base of G.T.R. rail, centre of culvert, Lachine, P.Q.	86·08	86·38
CCCXCVI.	On S.E. corner of McRea's double house, Lachine, P.Q.	79·18	79·49
CCCXCVII.	On N.W. corner of Fulton's brick house, Lachine, P.Q.	76·67	76·97
537	On root of elm tree, foot of avenue to Dorval R.C. church	82·03	82·34
CCCXCVIII.	On rear corner of W. face of Dorval R.C. church	93·53	93·85
538	Brass headed nail on root of elm tree opposite Houde's house	83·40	83·71
CCCXCIX.	On W. face of A. G. Legault's residence, Dorval	83·56	83·87
CCCC.	On W. face of Leon Denis' residence, Valois, P.Q.	82·38	82·70
	Base of C.P.R. rail at Valois station crossing	89·10	89·42
	Base of G.T.R. rail at Valois station crossing	89·43	89·75
CCCCI.	On S. face of G.T.R., arched culvert, Valois, P.Q.	73·82	74·16
CCCCII.	On S.E. corner of T. Legault's house, Pte. Claire	80·61	80·94
539	Brass headed nail on Pte. Claire wharf	75·82	76·15
CCCCIII.	On S.E. corner of Pte. Claire R.C. church	83·95	84·28
CCCCIV.	On S.E. corner of priest's residence, Pte. Claire	83·80	84·13
CCCCV.	On W. face of Alfred Dagenais' residence, Pte. Claire	82·07	82·41
CCCCVI.	On S.E. face of John Angell's residence, Pte. Claire	84·79	85·14
CCCCVII.	On E. face of Judge Ouimet's residence, Ste. Anne de Bellevue	88·78	89·14
CCCCVIII.	On W. face of H. Lanctot's house, Ste. Anne de Bellevue	79·91	80·28
	Base of G.T.R. rail at Ste. Anne de Bellevue station	121·19	121·54
	Base of C.P.R. rail at Ste Anne de Bellevue station	114·07	118·07
	Peak of E. abutment of C.P.R. bridge over Ottawa river	111·66	112·03
	Base of C.P.R. rail, centre of bridge over Ottawa river	111·05	111·43
	Base of G.T.R. rail, centre of bridge over Ottawa river	110·30	110·68
CCCCXII.	On coping N.E. corner of G.T.R. bridge over Ottawa river	105·49	105·87
540	Brass headed nail, S.E. corner of Lalonde's wharf	73·76	74·13
CCCCIX.	On E. face of first pier of G.T.R. bridge over Ottawa river	81·85	82·22
CCCCX.	On N.W. face of priest's house, Ste. Anne de Bellevue	88·75	89·12
CCCCXI.	On S.W. corner of R.C. church, Ste. Anne de Bellevue	86·69	87·06
541	On S.W. corner of new lock, Ste. Anne de Bellevue	81·45	81·82
541¼	On S.W. corner of new lock, Ste. Anne de Bellevue	81·45	81·82
	Upper sill of new lock, Ste. Anne de Bellevue	59·57	59·94
	Lower sill of new lock, Ste. Anne de Bellevue	57·66	58·03
	Lower sill of old lock, Ste. Anne de Bellevue	60·66	61·03
541	Brass headed nail on end of pier, entrance to locks	77·97	78·34
	Base of C.P.R. rail, W. end of bridge over Ottawa river	106·19	106·57
CCCCXIII.	On N. face of W. abutment of G.T.R. bri lge on Ile Perrot	91·96	92·33
	Base of G.T.R. rail, centre of bridge, on Ile Perrot	96·24	96·62
	Base of C.P.R. rail, centre of bridge, on Ile Perrot	94·79	95·17
CCCCXIV.	On S. end of E. abutment of G. T. R. bridge at Vaudreuil	91·89	92·27
	Base of G.T.R. rail, E. end of G. T. R. bridge at Vaudreuil	93·12	93·51
	Base of G.T.R. rail, centre of G.T.R. bridge, at Vaudreuil	91·53	91·92
	Base of G.T.R. rail, W. end of G.T.R. bridge at Vaudreuil	89·51	89·96
CCCCXV.	On S. end of west abutment of G.T.R. bridge at Vaudreuil	88·24	88·61
	Base of C.P.R. rail at Vaudreuil station	86·07	86·40
	Base of G.T.R. rail at Vaudreuil station	84·76	85·09
	Base of G.T.R. rail at Vaudreuil village crossing	84·54	84·87
CCCCXVI	On S.W. corner of Foster's house, road to Cascades	84·66	85·05
	Coping, end of long pier, lower entrance to Soulanges canal	79·52	79·90
	Coping, end of light house pier, lower entrance to Soulanges canal	79·31	79·69
CCCCXVII.	On N. face of stairway wall of lock 1, Soulanges canal	80.55	80·93
	Coping opposite stairway wall of lock 1, Soulanges canal.	78·51	78·89
	Coping opposite lower gates of lock 1, Soulanges canal	92·97	93·35
	Coping opposite upper gates of lock 1, Soulanges canal.	92·96	93·34
CCCCXVIII	On N. face of stairway of lock 2, Soulanges canal	95·37	95·75
	Coping opposite stairway of lock 2, Soulanges canal	92·96	93·34
	Coping opposite lower gates of lock 2, Soulanges canal	116·45	116·83
	Coping opposite upper gates of lock 2, Soulanges canal	116·46	116·84
CCCCXIX	On N. face of stairway of lock 3, Soulanges canal	119·76	120·14
	Coping opposite stairway of lock 3, Soulanges canal	116·39	116·77
	Coping opposite lower gates of lock 3, Soulanges canal	139·93	140·31

Rouses' Point to Cornwall, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Coping opposite upper gates of lock 3, Soulanges canal.	139·89	140·27
CCCCXX.	On N. face of stone block, lower side of bridge, Soulanges canal.	140·70	141·08
	Flooring, centre of bridge over Soulanges canal, St. Antoine road.	144·56	144·93
542	+On coping, upper end of N. abutment of bridge over canal	141·69	142·06
CCCCXXI	On N. face of stairway of lock 4, Soulanges canal.	142·02	142·39
	Coping opposite stairway of lock 4, Soulanges canal.	139·83	140·20
	Coping opposite lower gates of lock 4, Soulanges canal.	157·85	158·22
	Coping opposite upper gates of lock 4, Soulanges canal.	157·80	158·17
	Coping opposite upper gates north of lock 4, Soulanges canal.	157·76	158·13
CCCCXXII.	On E. face of N. abutment of canal bridge at St. Fereol road.	156·86	157·22
	Flooring centre of Soulanges canal bridge at St. Fereol road.	160·79	161·15
CCCCXXIII.	On N.W. corner of Cedars R. C. church.	158·39	158·75
	Top step, opposite main entrance to Cedars R. C. church.	156·78	157·14
CCCCXXIV.	On E. face of N. abutment of canal bridge at St. Dominique road.	156·81	157·16
	Flooring centre of Soulanges canal bridge at St. Dominique road.	160·77	161·12
543	+On stone step of building opposite canal electric power house.	158·35	158·70
CCCCXXV.	On E. face of N. abutment of canal bridge at Emmanuel road.	156·53	156·87
	Flooring, centre of Soulanges canal bridge at Emmanuel road.	160·87	161·21
CCCCXXVI.	On E. face of N. abutment of canal bridge at River Rouge road.	157·41	157·75
	Flooring, centre of Soulanges canal bridge at River Rouge road	161·18	161·52
544	Iron bolt, rear end of Coteau du Lac R.C. church.	156·02	156·35
545	Top step, opposite main entrance to Coteau du Lac church.	157·12	157·45
CCCCXXVII.	On stone front of Coteau du Lac R.C. church.	158·48	158·81
CCCCXXVIII.	On E. face of G.T.R. overhead of road along N. side of canal.	160·85	161·17
546	Iron bolt on W. face of overhead crossing of road N. side of canal.	159·44	159·76
CCCCXXIX.	On stone block, lower end of bridge over canal.	158·76	159·07
547	Iron bolt, W. face of G.T.R. overhead crossing S. of canal.	160·95	161·30
	Base of rail, crossing 3 miles E. of Coteau station.	158·90	159·21
624	On W. coping of S. abutment of highway bridge over Delisle river	158·40	158·71
DLXXIX.	On W. face of S. abutment of highway bridge over Delisle river	156·43	156·74
	Base of rail rear of Coteau station.	159·53	159·85
	Base of rail at Coteau station.	159·50	159·82
	Base of rail junction of branch to Ottawa.	159·40	159·72
DLXXVIII.	On S. end of E. abutment bridge 600 feet E. of St. Zotique station.	154·65	154·97
623	Base of rail, N. end of W. abutment bridge 600 feet E. of St. Zotique station.	158·41	158·73
	Base of rail, centre of bridge, 600 feet E. of St. Zotique station	159·12	159·44
	Base of rail at St. Zotique station crossing.	158·78	159·10
	Base of rail at St. Zotique station.	158·74	159·06
	Base of rail first crossing W. of St. Zotique station.	161·69	162·00
	Base of rail at River Beaudette station.	167·98	168·29
	Base of rail main crossing River Beaudette.	169·71	170·02
622	+On S. end of E. abutment, bridge over River Beaudette.	172·41	172·72
	Base of rail, centre of bridge over River Beaudette.	172·14	172·45
DLXXVII.	On S. face of W. abutment, bridge over River Beaudette.	169·45	169·76
	Base of rail at first crossing W. of River Beaudette.	173·78	174·09
	Base of rail at second crossing W. of River Beaudette.	167·51	167·82
	Base of rail centre bridge over Woods creek.	165·56	165·86
DLXXVI.	On S. face of W. abutment, bridge over Woods creek.	162·29	162·59
	Base of G.T.R. rail, third crossing W. of River Beaudette.	167·55	167·85
	Centre of bridge, Sutherland creek.	166·45	166·75
DLXXV.	On W. end of W. abutment of bridge, Sutherland creek.	163·05	163·35
621⅝	W. peak of S. coping of culvert, 800 feet W. of mile 48.	175·23	175·53
	Base of rail, centre of culvert, 800 feet W. of mile 48.	175·22	175·52
DLXXIV.	On S. end of W. wall of culvert, 800 feet W. of mile 48.	169·17	169·47
	Base of G.T.R. rail, opposite B.M. DLXXIII.	164·77	165·07
	Base of G.T.R. rail at Bainsville station.	173·06	173·36
DLXXIII.	On S. end of W. wall of culvert 140 feet E. of mile 50½.	159·27	159·57
	Base of rail, centre of culvert, E. of mile 51½.	163·44	163·74
DLXXII.	On W. wall of culvert, 1,075 feet E. of mile 51½.	157·17	157·47
	Base of G.T.R. rail, first crossing, E. of Lancaster station.	170·06	170·36
	Base of G.T.R. rail at Main street crossing.	163·74	164·04
	Base of G.T.R. rail, opposite Lancaster station.	163·26	163·56
DLXXI.	On N.E. corner of Lancaster station.	165·85	166·15
621⅜	Top of plinth course N.W. corner of Lancaster station.	165·29	165·59
	Base of rail, first crossing W. of Lancaster station.	161·54	161·84
DLXX.	On S. end of W. abutment of bridge over Black river.	162·97	163·27
621	+On S.E. coping of G.T.R. bridge over Black river.	165·62	165·92
	Base of G.T.R. rail, centre of bridge over Black river.	166·37	166·67
	Base of G.T.R. rail at road crossing, Summerstown.	166·14	166·44
	Base of G.T.R. rail at road crossing, Summerstown.	168·35	168·65
	Base of G.T.R. rail at road crossing, Summerstown.	169·41	169·71

SESSIONAL PAPER No. 19a

Rouses' Point to Cornwall, &c.—Complete List of Bench Marks, &c.—*Concluded.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental	Adjusted.
621	E. peak, S. coping, W. wall of culvert at mile 57·2	169·95	170·25
	Base of rail, centre of culvert, 870 feet W. of mile 57	169·58	169·88
DLXIX.	On S.W. corner of culvert, 870 feet W. of mile 57	164·97	165·27
	Base of rail, opposite B.M. DLXVIII	173·20	173·50
DLXVIII.	On E. end of S. wall, culvert 1,050 feet E. of mile 58	168·72	169·02
	Base of rail at crossing, Summerstown	172·71	173·01
	Base of rail at crossing, Summerstown	176·44	176·74
621	+On boulder, N. of track, 65 feet E. of semaphore	183·14	183·44
	Base of rail at street crossing	176·64	176·94
	Base of rail opposite Summerstown station	182·71	183·01
	Base of rail opposite B.M. DLXVII	180·43	180·73
DLXVII.	On boulder, N. of railway, 1,070 feet W. of mile 59½	180·49	180·79
	Base of rail at road crossing, Summerstown	184·80	185·10
	Base of rail at road crossing, Summerstown	176·63	176·93
	Base of rail, centre of culvert at mile 62·6	176·11	176·41
620	+S.W. corner of culvert at mile 62·6	174·72	175·02
DLXVI.	On W. end of S. face of culvert, opposite mile 63	177·92	178·22
	Base of rail, culvert opposite mile 63	181·43	181·73
619¾	S.W. coping of G.T.R. culvert, mile 63	180·83	181·13
	Base of G.T.R. rail, crossing Summerstown	177·01	177·31
	Base of G.T.R. rail, crossing Summerstown	173·43	173·73
	Base of rail opposite B.M. DLXV, Summerstown	175·04	175·34
DLXV.	On S. end of E. wall of culvert 225·4 feet E. of mile 65	170·92	171·22
	Base of G.T.R. rail, opposite B.M. DLXIV	187·95	188·25
DLXIV.	On E. end of S. face of G.T.R. culvert	184·47	184·77
	Base of G.T.R. rail at Marlborough St. crossing	191·40	191·70
	Base of G.T.R. rail at Marlborough St. crossing	189·59	189·89
	Base of G.T.R. rail opposite B.M. 619¼	187·62	187·92
619¼	E. peak, S. coping, W. wall of G.T.R. culvert	187·71	188·01
	Base of G.T.R. rail opposite Cornwall station	192·17	192·47
619½	On N. face of Cornwall stone station	194·55	194·85
DLXII.	On S. face of Cornwall stone station	194·17	194·47
	Base of G.T.R. rail at Pill St. crossing, Cornwall	192·08	192·38
	Base of G.T.R. rail at road crossing, Cornwall	190·22	190·52
	Base of G.T.R. rail at road crossing	195·36	195·66
	Base of G.T.R. rail opposite B.M. DLXXX	199·97	200·27
DLXXX.	On N.W. corner of G.T.R. culvert, near Junction	196·08	196·38
	Base of N.Y. & O. Railway rail at Cornwall station junction	201·23	201·53
	Base of N.Y. & O. Railway rail at Cornwall station crossing	216·32	216·62
	Base of N.Y. & O. Railway rail at Cornwall station crossing	218·83	219·13
DLXI.	On N.E. face of first pier of N.Y. & O. Ry. bridge, Cornwall	165·36	165·66
'C.'	On upper course of N. wall of old lock 18, Cornwall	187·98	188·28
	Flooring, centre of bridge over canal at Augusta street	184·42	184·72
DLXIII.	Foot of stairway, leading of new lock 15, Cornwall	159·50	159·80
619	+On lower end of N. wall of new lock 15, Cornwall	166·85	167·15
'A'	On lower end of S. wall of new lock 15, Cornwall	166·73	167·03
'B.'	On lower end of S. wall of old lock 15, Cornwall	162·59	162·89

VAUDREUIL TO NORTH BAY VIA RIGAUD, VANKLEEK HILL, OTTAWA, ARNPRIOR, RENFREW, PEMBROKE AND MATTAWA.

Bench Marks.	Location and Description.	Elevations. Instrumental.	Adjusted.
CCCCXV.	On S. end of W. abutment, G.T.R. bridge over Ottawa river, Vaudreuil	88·30	88·61
	Base of G.T.R. rail, opposite B.M. CCCCXV	89·55	89·89
CCCCXXX.	On S.E. corner of bridge over brook, opposite Vaudreuil church	84·55	84·88
	Base of C.P.R. rail, centre of bridge, opposite Vaudreuil church	86·57	86·88
CCCCXXXI.	On stone front of Vaudreuil R.C. church	86·55	86·89
	Base of C.P.R. rail at crossing	94·09	94·40
548	Brass headed nail in elm root, 50 feet W. of track, ½ mile N. of the Cadieux station	94·34	94·69
	Base of C.P.R. rail, crossing, Como, P.Q	90·19	90·50
CCCCXXXII.	On W. end of S. face of culvert, 1,000 feet S. of Como station.	87·58	87·93
	Base of C.P.R. rail, opposite B.M. CCCCXXXII	89·53	89·85
	Base of C.P.R. rail, opposite Como station	99·30	99·62
	Base of C.P.R. rail, main road crossing, Hudson	113·61	113·94
CCCCXXXIII.	On W. end of S. face of culvert, 1,535 feet S. of Hudson station.	97·96	98·31
	Base of C.P.R. rail, opposite B.M. CCCCXXXIII	100·23	100·55
	Base of C.P.R. rail, opposite Hudson station	91·57	91·90
	Base of C.P.R. rail, opposite Hudson Heights station	87·92	88·24
	Base of C.P.R. rail, main road crossing	98·37	98·69
CCCCXXXIV.	On N. end of S. face of culvert, one mile E. of Lavigne station.	87·16	87·53
	Base of C.P.R. rail, opposite B.M. CCCCXXXIV	90·68	91·01
	Base of C.P.R. rail, opposite Lavigne station	105·64	105·97
	Base of C.P.R. rail, opposite main road crossing	103·97	104·30
549	Brass headed nail on elm root, second tree W. of track	103·43	103·80
CCCCXXXV.	On S. face of W. abutment of bridge 2 miles E. of Rigaud	98·53	98·89
	Base of rail, centre of bridge, 2 miles E. of Rigaud station	99·41	99·75
	Base of C.P.R. rail, opposite Rigaud station	103·90	104·24
	Base of C.P.R. rail, centre of bridge over Riv. à la Graisse	104·20	104·54
CCCCXXXVI.	On S. face of W. abutment of bridge over Riv. à la Graisse	99·37	99·74
CCCCXXXVII.	On rear end N. side of Rigaud R.C. church	108·74	109·11
	Base of C.P.R. rail, junction of branch to Pte. Fortune	106·81	107·15
	Base of C.P.R. rail, crossing on branch to Pte. Fortune	122·17	122·52
550	+On N.E. corner of culvert, 4·10 miles from Pte. Fortune junction	98·90	99·29
	Base of C.P.R. rail, opposite B.M. 550	105·49	105·84
551	+On N.E. corner of culvert, 4·8 miles from Pte. Fortune junction	92·03	92·41
	Base of C.P.R. rail, opposite B.M. 551	92·20	92·55
552	Brass headed nail on S.W. root of tree, 1,650 feet E. of Pte. Fortune station	126·06	126·44
	Base of C.P.R. rail at Pte. Fortune station	123·57	123·93
CCCCXXXVIII.	On centre of E. foundation of Pte. Fortune post office	83·73	84·13
553	Brass headed nail on S.W. corner of Pte. Fortune post office wharf	80·41	80·81
	Base of C.P.R. rail crossing, 2¼ miles W. of Rigaud bridge	147·29	147·64
	Base of C.P.R. rail, crossing boundary between Quebec and Ontario	171·77	172·12
	Base of C.P.R. rail, crossing one mile E. of St. Eugene	182·92	183·28
	Base of C.P.R. rail at St. Eugene station	180·90	181·27
	Base of C.P.R. rail, centre of St. Eugene station culvert	180·82	181·19
CCCCXXXIX.	On S. end of W. wall of St. Eugene station culvert	177·44	177·84
CCCCXL.	Under bay window of priest's residence, St. Eugene	190·43	190·82
CCCCXLI.	On N.E. corner stone front of St. Eugene R.C. church	191·54	191·94
	Base of C.P.R. crossing	184·19	184·55
CCCCXLII.	On S. end of W. face of culvert, 3 miles W. of St. Eugene station	226·43	226·82
	Base of C.P.R. rail, centre of culvert W. of St. Eugene station.	232·06	232·42
	On E. end of W. face of culvert, 3 miles W. of St. Eugene station	226·43	226·82
	Base of C.P.R. rail first crossing E. of station	259·00	259·38
	Base of C.P.R. rail at Stardale station	290·39	290·77
	Base of C.P.R. rail at Stardale station crossing	290·88	291·26
	Base of C.P.R. rail, centre of culvert, marked 31·8 miles	250·56	250·97
CCCCL.	On S. side of E. abutment of culvert along C.P.R., marked 31·8 miles	247·98	248·38
CCCCLI.	On centre of W. side of Hawkesbury R.C. church	147·92	148·34
	Base of G.T.R. rail at G.T.R. station, Hawkesbury	142·95	143·34
	Base of G.T.R. rail, Main street crossing, Hawkesbury	143·81	144·20
560	On N.E. corner of culvert near junction of G.N.R.	159·36	159·78
	Base of G.T.R. rail, crossing of Morris lane, Hawkesbury	180·88	181·28
	Base of G.T.R. rail crossing, branch to Hawkesbury	183·00	183·39
	Base of G.T.R. rail crossing, branch to Hawkesbury	241·29	241·67
	Base of G.T.R. rail crossing, branch to Hawkesbury	258·37	258·75
	Base of C.P.R. rail, crossing of G.T.R. to Hawkesbury	263·84	264·27

SESSIONAL PAPER No. 19a

VAUDREUIL to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
559	Brass headed nail on elm tree. 100 feet S. of C.P.R. and 150 feet E. of G.T.R.	261·21	261·62
	Base of rail at crossing of G.T.R. railway to Hawkesbury..	263·90	264·27
	Base of rail at Vankleek Hill crossing	270·89	271·28
	Base of rail at Vankleek Hill station	271·53	271·92
	Base of rail, third crossing, E. of McAlpin's station	261·21	261·60
	Base of rail, second crossing E. of McAlpin's station	216·25	216·63
CCCCXLIX.	On N.E. corner of McAlpin's post office	223·28	223·69
	Base of rail at McAlpin's station	221·79	222·17
	Base of rail at second crossing E. of Caledonia Springs,	213·15	213·55
	Base of rail, first crossing E. of Caledonia Springs	188·93	188·33
CCCCXLVIII.	On S. end, E. abutment of culvert marked 39·33 miles	181·00	181·42
	Base of C.P.R. rail, centre of culvert, marked 39·33 miles..	183·55	183·95
	Base of C.P.R. rail at Caledonia Springs station	167·38	167·77
CCCCXLVII.	On N. face of post office, Caledonia Springs	166·80	167·23
	Base of C.P.R. rail, crossing Caledonia Springs	167·15	167·85
	Base of C.P.R. rail, centre of trestle, Caledonia Springs	167·42	167·82
	Base of C.P.R. rail at crossing, Caledonia Springs	170·72	171·13
558	Brass headed nail, centre of culvert, marked 43 miles	172·18	172·62
	Base of rail, crossing opposite peat factory	174·54	174·95
	Base of rail, crossing	178·66	179·07
	Base of rail at Alfred station	177·47	177·88
	Base of rail, first crossing W. of Alfred station	177·79	178·21
	Base of rail, second crossing W. of Alfred station	176·01	176·43
	Base of rail, third crossing E. of Plantagenet station	174·54	174·95
	Base of rail, second crossing, E. of Plantagenet station	198·42	198·83
CCCCXLVI.	On N. face, E. abutment, bridge over S. Nation river	168·59	169·05
	Base of C.P.R. rail, centre of bridge over S. Nation river	169·73	170·16
CCCCXLV.	On S. face, N. abutment, bridge over S. Nation river	165·21	165·66
	Base of C.P.R. rail at Plantagenet crossing	169·58	170·00
	Base of C.P.R. rail at Plantagenet station	169·51	169·93
557	On N.E. corner of bridge, marked 51·3 miles	169·78	170·24
	Base of C.P.R. rail, centre of bridge, marked 51·3 miles	171·69	172·12
	Base of C.P.R. rail crossing, Plantagenet	211·21	211·64
556	Brass headed nail, centre of wooden bridge, marked 54·2 miles.	242·24	242·70
	Base of C.P.R. rail at crossing, Pendleton	241·37	241·80
	Base of C.P.R. rail at crossing, Pendleton	241·34	241·76
	Base of C.P.R. rail at Pendleton station crossing	233·10	233·53
	Base of C.P.R. rail at Pendleton station crossing	231·80	232·23
	Base of C.P.R. rail, fifth crossing, E. of The Brook station	217·12	217·56
CCCCXLIV.	On S. face of E. abutment of culvert, marked 57 miles	192·32	192·78
	Base of C.P.R. rail, centre of culvert, marked 57 miles	194·53	194·97
	Base of C.P.R. rail, fourth crossing, E. of The Brook station.	164·91	165·34
555	Brass headed nail, N. side of E. end of trestle over The Brook	163·68	164·15
	Base of C.P.R. rail, centre of bridge over The Brook	165·59	166·02
	Base of C.P.R. rail, third crossing E. of The Brook station	167·29	167·74
	Base of C.P.R. rail, second crossing E. of The Brook station .	180·07	180·52
	Base of C.P.R. rail at The Brook crossing	206·51	206·96
CCCCXLIII.	Under first window, N. side of The Brook R.C. church	209·83	210·31
554	Brass headed nail on W. root of tree, 75 feet S. of track, The Brook crossing	212·15	212·63
	Base of C.P.R. rail, opposite The Brook station	214·78	215·23
	Base of C.P.R. rail, first crossing, W. of The Brook station..	215·58	216·02
	Base of C.P.R. rail, second crossing, W. of The Brook station	211·92	212·37
	Base of C.P.R. rail, third crossing, W. of The Brook station	213·63	214·08
	Base of C.P.R. rail, fourth crossing, W. of The Brook station	210·67	211·12
CCCCLII.	On N. end of E. wall of culvert on C.P.R., marked 64·1 miles.	206·66	207·15
	Base of C.P.R. rail, centre of culvert, marked 64·1 miles	211·44	211·90
	Base of C.P.R. rail, 5th crossing, W. of The Brook station	218·38	218·84
	Base of C.P.R. rail at Hammond station	219·54	219·99
	Base of C.P.R. rail, crossing of G.T.R. to Rockland	219·59	220·04
	Base of C.P.R. rail, first crossing W. of Hammond station	242·34	242·80
	Base of C.P.R. rail, second crossing W. of Hammond station.	267·70	268·16
	Base of C.P.R. rail, third crossing W. of Hammond station..	274·22	274·68
	Base of C.P.R. rail, fourth crossing W. of Hammond station.	273·66	274·13
	Base of C.P.R. rail, fifth crossing W. of Hammond station...	276·54	277·01
	Base of C.P.R. rail at Leonard station	271·64	272·10
	Base of C.P.R. rail at Leonard crossing	271·56	272·03
CCCCLIII.	On N.W. corner of Leonard county court house	271·38	271·87
	Base of C.P.R. rail, second crossing W. of Leonard station	276·49	276·95
	Base of C.P.R. rail, third crossing W. of Leonard station	276·96	277·42
	Base of C.P.R. rail, fourth crossing W. of Leonard station	271·21	271·69
	Base of C.P.R. rail, fifth crossing W. of Leonard station	237·95	238·42
	Base of C.P.R. rail at Navan station	239·97	240·44
	Base of C.P.R. rail at Navan station crossing	238·68	239·15
	Base of C.P.R. rail, second crossing W. of Navan station	235·49	235·96
	Base of C.P.R. rail, third crossing W. of Navan station	234·41	234·89
	Base of C.P.R. rail, fourth crossing W. of Navan station	229·29	229·77
	Base of C.P.R. rail, fifth crossing W. of Navan station	230·29	230·77

VAUDREUIL to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations. Instrumental.	Adjusted.
	Base of C.P.R. rail at Blackburn station...	229·01	229·49
	Base of C.P.R. rail at Blackburn crossing...	227·99	228·48
561	+On S.W. corner of culvert, 3¼ miles E. of Rideau river....	209·87	210·39
	Base of C.P.R. rail, third crossing E. of Rideau river.....	226·32	226·81
	Base of C.P.R. rail, second crossing E. of Rideau river.....	219·81	220·30
	Base of C.P.R. rail at crossing of St. L. & O. Ry.....	197·09	197·58
	Base of C.P.R. rail at crossing E. side of Rideau river.....	197·32	197·83
CCCCLIV.	On N. side of E. abutment, C.P.R. bridge over Rideau river..	194·68	195·22
	Base of rail, centre of C.P.R. bridge over Rideau river.....	197·69	198·20
	Base of rail, centre of G.T.R. bridge over Rideau river.....	195·11	195·61
CCCCLV.	On foot of E. face of W. abutment, Laurier bridge, Ottawa...	217·19	217·72
CCCCLVIII.	On W. side of main entrance to Woods building, Ottawa...	223·12	223·65
CCCCLIX.	Under second window, S. side of City Hall, Ottawa.....	240·36	240·89
	Base of rail at Central station, Ottawa.....	213·71	214·21
CCCCLVI.	On N.E. corner of W. pier of Dufferin bridge, Ottawa..	212·82	213·35
562	+On W. end of lower gates of lock 1, Rideau canal...	154·14	154·68
CCCCLVII.	Foot of W. curved wall of lock 1, Rideau canal.....	135·18	135·72
	Zero of lock 1 gauge, Rideau canal.....	122·37	122·90
	Coping, E. end of lower gates of lock 1, Rideau canal....	154·11	154·65
	Coping, E. end of lower gates of lock 2, Rideau canal....	154·11	154·65
CCCCLXXIII.	On shore end of E. face of lock 1, Rideau canal.....	153·13	153·66
	Coping, E. end of lower gates of lock 3, Rideau canal...	169·87	170·40
	Coping, E. end of lower gates of lock 4, Rideau canal....	170·06	170·59
	Coping, E. end of lower gates of lock 5, Rideau canal...	179·89	180·42
	Coping, E. end of lower gates of lock 6, Rideau canal.....	189·93	190·47
	Coping, E. end of lower gates of lock 7, Rideau canal.....	199·71	200·24
	Coping, E. end of lower gates of lock 8, Rideau canal.....	211·66	212·19
	Coping, E. end of upper gates of lock 8, Rideau canal.....	211·69	212·23
CCCCLVI.	On N.E. corner of W. pier of Dufferin bridge, Ottawa.....	212·81	213·35
	Base of C.P.R. rail, centre of Alexandra bridge.....	192·30	192·85
	High water elevation of Hull concrete wharf.....	146·56	147·07
	Medium elevation of Hull concrete wharf.....	140·85	141·35
CCCCLXXII.	70 feet from S.W. corner of Hull concrete wharf.....	146·56	147·09
CCCCLXXI.	Coping, W. shore end of Hull concrete wharf.....	147·01	147·52
	On E. abutment of C.P.R. crossing of E. Ry., Hull end of Alexandra bridge.....	174·01	174·54
CCCCLXX.	On S.E. side of rear entrance to Hull R.C. church.....	177·71	178·25
	Centre of Union bridge between Hull and Ottawa.....	164·83	165·34
CCCCLXIX.	On E. end of N. abutment of bridge between Ottawa and Hull	164·07	164·60
CCCCLIX.	Under second window, S. side of City Hall, Ottawa.....	240·36	240·89
CCCCLXVIII.	Between first and second window, Mortimer Co. building, Ottawa.....	238·3	238·91
CCCCLXVII.	On W. side of entrance N. side of Water Works building, Ottawa.....	179·00	179·54
CCCCLXVI.	On S. side of private entrance Union station, Ottawa.....	184·53	185·06
	Base of C.P.R. rail at Union station, Ottawa.....	180·93	181·43
	Base of C.P.R. rail, centre of Prince of Wales bridge, Ottawa.	190·78	191·28
CCCCLXV.	On W. side of W. abutment, centre of Prince of Wales bridge, Ottawa.....	185·35	185·89
	Base of C.P.R. crossing, Chaudiere St., Ottawa.....	185·45	185·96
	Base of C.P.R. crossing, Centre street, Ottawa.....	198·78	199·30
	Base of C.P.R. crossing, Queen street, Ottawa.....	202·87	203·38
	Base of C.P.R. crossing.....	214·56	215·08
CCCCLXXIV.	On S. end of W. wall of culvert 1·7 miles W. of Ottawa.....	200·24	200·79
	Base of C.P.R. rail, centre of culvert, 1·7 miles W. of Ottawa.	205·73	206·25
	Base of C.P.R. rail crossing, 1,500 feet W. of Exchange Hotel.	216·98	217·49
	Base of C.P.R. rail, centre of culvert, ⅓ mile E. of Britannia station.....	192·19	192·71
CCCCLXIII.	On N. side of E. wall of G.T.R. culvert, ⅓ mile E. of Britannia station.....	190·35	190·89
CCCCLXII.	On S.E. corner of J. Whitton house, next to Britannia P.O.	203·19	203·74
	Base of C.P.R. rail, opposite post office crossing, Britannia	202·85	203·38
	Base of C.P.R. rail, opposite O.E. Ry. pier, Britannia.....	202·35	202·88
	On inner down stream, corner of O.E. Ry. pier, Britannia....	198·39	198·95
	On inner up stream, corner of O.E. Ry. pier, Britannia.....	198·48	199·03
	Base of C.P.R. rail, second crossing E. of G.T.R. crossing.....	206·87	207·40
	Base of C.P.R. rail, first crossing E. of G.T.R. crossing.....	214·13	214·65
	Base of C.P.R. rail, under G.T.R. crossing of C.P.R.....	217·67	218·19
	Base of G.T.R. rail, centre of overhead crossing of C.P.R....	241·61	242·13
CCCCLXI.	On S. side of W. wall of G.T.R. crossing of C.P.R.....	238·60	239·15
567	On N. side of W. wall of G.T.R. crossing of C.P.R.....	241·19	241·75
	Base of G.T.R. rail, centre of trestle...	235·60	236·13
	Base of G.T.R. rail, centre of trestle...	219·51	220·03
	Base of G.T.R. rail, sixth crossing E. of S. March station.....	219·78	220·30
	Base of G.T.R. rail, fifth crossing E. of S. March station.....	219·84	220·26
	Centre of culvert, back of John Beattie's house.....	242·14	242·67
566	On S.E. corner of culvert, back of John Beattie's house.....	240·97	241·54
	Base of G.T.R. rail, fourth crossing E. of March station.....	245·67	246·21
	Base of G.T.R. rail, third crossing E. of March station.....	251·83	252·37

SESSIONAL PAPER No. 19a

Vaudreuil to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued*,

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, second crossing E. of March station...	257·10	257·64
	Base of G.T.R. rail, first crossing E. of March station.....	273·86	274·40
	Base of G.T.R. rail at South March station.....	283·12	283·66
	Base of G.T.R. rail, culvert, 700 feet W. of S. March station.:	28[illegible]·70	289·24
565	On S.E. corner of G.T.R. culvert, 700 feet W. of S. March station.....	286·68	287·24
	Base of G.T.R. rail, first crossing, W. of March station.....	320·05	320·59
	Base of G.T.R. rail, third crossing, E. of Carp station.....	338·13	338·66
	Base of G.T.R. rail, main road crossing, Carp station.....	324·03	324·57
	Base of G.T.R. rail, culvert 3 miles E. of Carp station.....	319·58	320·12
564	On S.E. corner of culvert 3 miles E. of Carp station.....	317·96	318·52
	Base of G.T.R. rail, centre of culvert, Carp.....	316·14	316·68
	Base of G.T.R. rail, first crossing E. of Carp station.....	310·51	311·06
563	Brass headed nail on S.E. corner of culvert 1,450 feet E. of Carp station.....	309·94	310·52
	Base of G. T. R. rail, centre of culvert, 1,450 ft. E. of Carp station.....	310·58	311·12
	Base of G. T. R. rail, opposite Carp station.....	310·31	310·86
	Base of G. T. R. rail, 1st crossing W. of Carp station.....	307·01	307·55
	Base of G. T. R. rail, 2nd crossing W. of Carp station.....	305·88	306·42
	Base of G. T. R. rail, centre of culvert over Carp river.....	309·73	310·29
CCCCLX.	On N. side of E. abutment, G. T. R. culvert over Carp river..	307·35	307·93
	Base of G. T. R. rail, 3rd crossing W. of Carp station.....	311·84	312·40
CCCCLXXIV.	On S. side of E. wall of culvert, 3 miles W. of Carp station.	310·04	310·62
	Base of G. T. R. rail, centre of culvert, 3 miles W. of Carp station	312·87	313·43
	Base of G. T. R. rail, 4th crossing W. of Carp station.....	308·67	309·22
	Base of G. T. R. rail, 5th crossing W. of Carp station.....	305·39	305·94
570	On S.E. corner of G. T. R. culvert, 4 miles E. of Kinburn station.	303·28	303·86
	Base of G. T. R. rail, opposite bench mark 570.....	303·97	304·53
	Base of G. T. R. rail at Avondale crossing.....	305·87	306·43
	Base of G. T. R. rail at Avondale station.....	305·95	306·52
571	On S.W. corner of culvert, 2·10 miles E. of Kinburn station..	307·52	308·12
	Base of G. T. R. rail, opposite bench mark 571.....	308·33	308·90
	Base of G. T. R. rail, 1st crossing E. of Kinburn station.....	314·30	314·87
	Base of G. T. R. rail, at Kinburn station.....	311·53	312·09
	Base of G. T. R. rail, at Kinburn crossing.....	310·38	310·94
572	On S.E. corner of G. T. R. culvert, 930 ft. W. of Kinburn station.....	307·25	307·85
	Base of G. T. R. rail, centre of culvert, 930 ft. W. of Kinburn station.....	307·94	308·50
	Base of G. T. R. rail, centre of culvert over large brook.....	303·14	308·71
	Base of G. T. R. rail, 2nd crossing W. of Kinburn station....	312·97	313·55
	Base of G. T. R. rail 3rd crossing W. of Kinburn station....	323·25	323·82
573	On N.E. corner of culvert, 2 miles W. of Kinburn station....	335·36	335·97
	Base of G. T. R. rail, opposite bench mark 573.....	336·25	336·83
	Base of G. T. R. rail, 4th crossing W. of Kinburn station...	336·76	337·34
	Base of G. T. R. rail, 6th crossing W of Kinburn station.....	310·89	311·47
CCCCLXXV.	On E. side of N. abutment of G. T. R. bridge Mississippi river.....	290·93	291·53
	Centre of G. T. R. bridge over Mississippi river, Galetta.....	289·96	290·54
CCCCLXXVI.	On up stream end of S.W. abutment, bridge over Mississippi river.....	290·13	290·73
	Centre of over-head crossing of main road, Galetta.....	289·96	290·53
	Base of G. T. R. rail at Galetta station.....	292·75	293·32
	Base of G. T. R. rail at Galetta crossing.....	293·66	294·23
	Base of G. T. R. rail, 2nd crossing W. of Galetta station.....	304·08	304·67
574	On N.E. corner of culvert, 1¼ miles W of Galetta station....	307·28	307·90
	Base of G. T. R. rail at Marshall's Bay station.....	312·17	312·75
	Base of G. T. R. rail, 1st crossing W. of Marshall's Bay station.....	308·30	308·89
	Base of G. T. R. rail, 2nd crossing W. of Marshall's Bay station	313·80	314·39
	Base of G. T. R. rail, 3rd crossing W. of Marshall's Bay station	310·67	311·25
	Base of G. T. R. rail, German street crossing, Arnprior.....	292·34	292·93
	Base of G. T. R. rail, Russell street crossing, Arnprior.....	293·84	294·42
	Base of G. T. R. rail, Daniel street crossing, Arnprior.....	295·50	296·08
	Base of G. T. R. rail, John street crossing, Arnprior.....	297·47	298·05
	Base of C. P. R. rail, C. P. R. station, Arnprior.....	298·22	298·82
CCCCLXXVII.	On centre of W. end foundation, C. P. R. station, Arnprior.	300·55	301·17
	Base of C. P. R. rail at crossing of G. T. R., Arnprior.....	300·07	300·67
	Base of C. P. R. rail, Norma street crossing, Arnprior.....	300·59	301·18
	Base of C. P. R. rail, town line crossing, Arnprior.....	301·12	301·71
575	On elm tree, close to C. P. R. W. fence, 5,575 ft. W. of C. P. R. station.....	298·32	298·95
	Base of C. P. R. rail, 3rd cross road W of Arnprior station...	299·33	299·92
CCCCLXXVIII	On N.E. corner of culvert, 54·1 miles W. of Ottawa.....	279.57	280·20
	Base of C. P. R. rail, opposite bench mark CCCCLXXVIII...	284·73	285·33
	Base of C. P. R. rail, at Braeside crossing.....	278·58	279·18

VAUDREUIL to North Bay, &c. Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of C. P. R. rail, at Braeside station	278·85	279·45
CCCCLXXIX.	On N.W. face of culvert, 56·9 miles W. of Ottawa	264·81	265·44
	Base of C. P. R. rail, opposite bench mark CCCCLXXIX	274·22	274·83
582	On S.W. corner, of culvert, 56·9 miles W. of Ottawa	273·12	273·75
	Base of C. P. R. rail, opposite bench mark 582	275·41	276·02
	Base of C. P. R. rail, at Sand Point station	264·82	265·43
CCCCLXXXVII.	On front of new brick school, centre of Sand Point village	267·07	267·71
	Base of C. P. R. rail, 1st crossing W. of Sand Point station	268·76	269·36
	Base of C. P. R. rail, 2nd crossing W. of Sand Point station	287·16	287·77
	Base of C. P. R. rail, 3rd crossing W. of Sand Piont station	288·43	289·03
	Base of C. P. R. rail, opposite bench mark CCCCLXXXVI	269·92	270·53
CCCCLXXXVI.	On W. end of N. face of culvert, 59·7 miles W. of Ottawa	261·92	262·56
	Base of C. P. R. rail, culvert, 60·6 miles W. of Ottawa	251·22	251·82
581	On N.E. corner of culvert, 60·6 miles W. of Ottawa	250·07	250·70
	Base of C. P. R. rail, 1st crossing E. of Castleford station	255·99	256·60
	Base of C. P. R. rail, at Castleford station	263·86	264·47
	Base of C. P. R. rail, 1st crossing W. of Castleford station	264·50	265·11
	Centre of C. P. R. bridge over brook W. of Castleford station	265·58	266·20
	Base of C. P. R. rail, 2nd crossing W. of Castleford station	303·13	303·74
	Base of C. P. R. rail, culvert 63·5 miles W. of Ottawa	304·55	305·16
580	On N.E. corner of culvert 63·5 miles W. of Ottawa	303·86	304·50
	Base of C. P. R. rail, 4th crossing E. of Russell station	333·69	334·31
	Base of C. P. R. rail, 3rd crossing E. of Russell station	350·33	351·00
	Base of C. P. R. rail, 2nd crossing E. of Russell station	408·08	408·71
	Base of C. P. R. rail, 1st crossing E. of Russell station	409·11	409·74
	Base of C. P. R., centre of culvert, 66·7 miles W. of Ottawa	409·77	410·40
579	On N.W. corner of culvert, 66·7 miles W. of Ottawa	408·54	409·20
	Base of C. P. R. rail, at Russell platform station	415·44	416·06
	Base of C. P. R. rail, 4th crossing E. of Renfrew station	442·52	443·14
	Base of C. P. R. rail, opposite bench mark 578	439·75	440·38
578	On N.W. corner of culvert, 68·5 miles W. of Ottawa	439·21	439·86
	Base of C. P. R. rail, 3rd crossing E. of Renfrew station	444·71	445·33
	Base of C. P. R. rail, 2nd crossing E. of Renfrew station	441·49	442·12
	Base of C. P. R. rail, street crossing, Renfrew station	418·38	419·01
CCCCLXXXV.	On N. base of C. P. R. tank, Renfrew station	418·58	419·25
CCCCLXXXIV.	On E. end foundation of Renfrew station	417·82	418·48
	Base of C. P. R. rail, at Renfrew station	415·81	416·45
	Base of C. P. R. rail, crossing W. of Douglas street, Renfrew	414·52	415·15
	Base of C. P. R. rail, crossing of Monro street, Renfrew	412·05	412·69
	Base of C. P. R. rail, crossing of Main street, Renfrew	410·26	410·89
	Base of C. P. R. rail, crossing of Argyle street, Renfrew	406·45	407·09
	Base of C. P. R. rail, crossing E. of Douglas street, Renfrew	402·48	403·11
	Base of C. P. R. rail, crossing Douglas street, Renfrew	399·48	400·12
	Base of C. P. R. rail, crossing W. of Douglas street, Renfrew	398·55	399·19
CCCCLXXXIII.	On S. end of S. abutment bridge over Bonnechere river, Renfrew	388·03	388·69
	Centre of C. P. R. bridge over Bonnechere river	388·12	388·76
CCCCLXXXII.	On E. face of N. abutment, C. P. R. bridge over Bonnechere river	385·34	386·00
	Base of C. P. R. rail, 3rd crossing, E. of Eganville Junction	400·80	401·44
	Base of C. P. R. rail, opposite bench mark 577	403·99	404·62
577	On N.E. corner of culvert, 72·5 miles W. of Ottawa	403·27	403·93
	Base of C. P. R. rail, 2nd crossing E. of Eganville Junction	405·20	405·83
	Base of C. P. R. rail, 1st crossing E. of Eganville Junction	403·81	404 44
	Base of C. P. R. rail, at Eganville Junction	405·02	405·66
	Base of C. P. R. rail, opposite bench mark 576	431·40	432·04
576	On N.W. corner of culvert, 74·6 miles W. of Ottawa	431·12	431·79
	Base of C. P. R. rail, 2nd crossing E. of Haley's station	441·66	442·30
	Base of C. P. R. rail, 1st crossing E. of Haley's station	511·80	512·44
	Base of C. P. R. rail, opposite bench mark CCCCLXXXI	515·39	516·03
CCCCLXXXI.	On E. face of C. P. R. culvert, 76·88 miles W. of Ottawa	511·56	512·23
	Base of C. P. R. rail, at Haley's station	528·63	529·28
	Base of C. P. R. rail, 1st crossing W. of Haley's station	526·49	527·15
	Base of C. P. R. rail, 2nd crossing W. of Haley's station	519·23	519·88
	Base of C. P. R. rail, opposite bench mark CCCCLXXX	517·87	518·53
CCCCLXXX	On E. face of C. P. R. culvert, 80·1 miles W. of Ottawa	509·50	510·19
	Base of C. P. R. rail, culvert, 80·1 miles W. of Ottawa	517·87	518·53
CCCCLXXXVIII	On E. face of C. P. R. culvert, 81·1 miles W, of Ottawa	507·46	508·14
	Base of C. P. R. rail, culvert, 81·1 miles W. of Ottawa	511·57	512·23
	Base of C. P. R. rail, 3rd crossing W. of Haley's station	507·68	508·33
	Base of C. P. R. rail, 4th crossing W. of Haley's station	496·48	497·13
	Base of C. P. R. rail, 5th crossing W. of Haley's station	499·55	500·20
CCCCLXXXIX.	On E. end of N. abutment of C. P. R. bridge over Gould's brook	474·47	475·17
	Base of C. P. R. rail, centre of C. P. R. bridge over Gould's brook	477·06	477·72
	Base of C. P. R. rail, 1st crossing, E. of Cobden station	474·82	475·49
	Base of C. P. R. rail, at Cobden station	474 91	475·57
	Base of C. P. R. rail, 1st crossing W. of Cobden station	475·60	476·27

VAUDREUIL to North Bay, &c. -Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
CCCCXC.	On E. face of C. P. R. culvert, 86·3 miles W. of Ottawa.....	472·86	473·55
	Base of C. P. R. rail, culvert, 86·3 miles W. of Ottawa.....	477·99	478·66
CCCCXCI.	On E. face of C. P. R. culvert, 87·2 miles W. of Ottawa... ...	452·74	453·45
	Base of C. P. R. rail, culvert, 87·2 miles W. of Ottawa.....	458·72	459·39
	Base of C. P. R. rail, 2nd crossing W. of Cobden station.....	449·87	450·54
CCCCXCII.	On W. face of C. P. R. culvert, 89·4 miles W. of Ottawa.....	427·31	428·02
	Base of C. P. R. rail, culvert, 89·4 miles W. of Ottawa.....	431·27	431·95
	Base of C. P. R. rail, 3rd crossing W. of Cobden station.....	433·26	433·93
	Base of C. P. R. rail, 4th crossing W. of of Cobden station...	441·76	442·44
	Base of C. P. R. rail, 5th crossing W. of Cobden station.....	434·70	435·37
	Base of C.P.R. rail, Snake River crossing.....	423·61	424·29
	Base of C.P.R. rail, Snake River station.....	423·05	423·73
583	On E. side of S. end of C.P.R. bridge over Snake river.....	413·16	413·88
	Centre of C.P.R. bridge over Snake river.....	415·16	415·85
	Base of C.P.R. rail, first crossing W. of Snake River.....	433·05	433·73
584	On end of C.P.R. culvert, 92·7 miles W. of Ottawa.....	444·30	445·01
	Base of C.P.R. rail, centre of culvert, 92·7 miles W. of Ottawa.	444·51	445·20
	Base of C.P.R. rail, second crossing W. of Snake River station	435·16	435·84
585	On E. end of C.P.R. culvert, 93·8 miles W. of Ottawa.....	434·73	435·44
	Base of C.P.R. rail, culvert, 93·8 miles W. of Ottawa.....	435·36	436·04
CCCCXCIII.	On W. end of S. wall of culvert, 94·7 miles W. of Ottawa....	418·78	419·49
	Base of C.P.R. rail, culvert, 94·7 miles W. of Ottawa.....	424·28	424·97
	Base of C.P.R. rail at Graham station.....	415·53	416·21
	Base of C.P.R. rail, centre of bridge, over Muskrat river.....	415·67	416·36
	Base of C.P.R. rail, first crossing W. of Graham station.....	419·00	419·70
CCCCXCIV.	On rock on E. side of track, 97·1 miles W. of Ottawa.....	429·56	430·29
	Base of C.P.R. rail opposite B.M. CCCCXCIV.....	427·91	428·61
CCCCXCV.	On E. face of C.P.R. culvert, 99 miles W. of Ottawa.....	440·62	441·35
	Base of C.P.R. rail, culvert, 99 miles W. of Ottawa.....	442·00	442·70
	Base of C.P.R. rail, government road crossing, Pembroke....	421·27	442·83
	Base of C.P.R. rail, government road platform, Pembroke....	422·14	421·97
586	On W. end of C.P.R. culvert, 100·7 miles W. of Ottawa.....	385·55	386·29
	Base of C.P.R. rail, opposite B.M. 586.....	387·29	388·00
	Base of C.P.R. rail, first crossing W. of government road stn.	377·83	378·54
	Base of C.P.R. rail, second crossing W. of govt. road station.	381·91	382·61
586½	Brass headed nail, 11 feet from lower end, inner edge of wharf.	371·22	371·96
	Base of C.P.R. rail, third crossing W. of govt. road station...	382·31	383·01
	Base of C.P.R. rail, fourth crossing W. of govt. road station.	378·76	379·46
	Base of C.P.R. rail, third crossing E. of Pembroke station...	379·37	380·09
	Base of C.P.R. rail, second crossing E. of Pembroke station..	379·26	379·98
	Base of C.P.R. rail, first crossing E. of Pembroke station....	380·32	381·04
	Base of C.P.R. rail at Pembroke station.....	380·18	380·89
CCCCXCVI.	Under window, N. end of Pembroke station.....	382·29	383·04
DIII.	On E. face of chimney of Pembroke water works building...	377·45	378·19
593	On S. end of culvert, E. side of crossing E. of Petawawa....	398·43	399·17
	Base of C.P.R. rail, thirteenth crossing E. of Petawawa.....	399·83	400·54
	Base of C.P.R. rail, twelfth crossing E. of Petawawa.....	414·14	414·86
	Base of C.P.R. rail, eleventh crossing E. of Petawawa.....	437·72	438·43
	Base of C.P.R. rail, culvert, 108·3 miles W. of Ottawa.....	430·14	430·86
DII.	On S.W. corner of culvert, 108·3 miles W. of Ottawa.....	409·02	409·77
	Base of C.P.R. rail, tenth crossing E. of Petawawa station...	427·77	428·48
	Base of C.P.R. rail, opposite B.M. DI.....	447·98	448·71
DI.	On N. end of E. face of culvert, 109·2 miles W. of Ottawa..	440·07	440·82
	Base of C.P.R. rail, ninth crossing E. of Petawawa station...	460·34	461·06
	Base of C.P.R. rail, eighth crossing E. of Petawawa station...	471·30	472·03
	Base of C.P.R. rail, seventh crossing E. of Petawawa station.	481·16	481·88
	Base of C.P.R. rail, 111·7 miles W. of Ottawa.....	481·92	482·65
D.	On N.W. face of culvert, 111·7 miles W. of Ottawa.....	467·03	467·79
	Base of C.P.R. rail, sixth crossing E. of Petawawa station....	482·10	482·82
	Base of C.P.R. rail, fifth crossing E. of Petawawa station....	481·34	482·07
592	On S.W. corner of culvert, 112·75 miles W. of Ottawa.....	484·21	484·96
	Base of C.P.R. rail, fourth crossing E. of Petawawa station...	484·59	485·32
	Base of C.P.R. rail, third crossing E. of Petawawa station....	477·18	477·91
	Base of C.P.R. rail, second crossing E. of Petawawa station..	474·46	475·19
	Base of C.P.R. rail, road to Petawawa wharf.....	468·61	469·35
	Base of C.P.R. rail at Petawawa station.....	466·61	467·34
DIV.	On S. face of rocky point, near water's edge, 1,400 feet above wharf.....	333·47	384·24
691½	Brass headed nail, up stream front end of Petawawa wharf...	372·71	373·48
	Centre of C.P.R. culvert at road to Petawawa wharf.....	464·19	464·93
591	On centre of E. end of culvert at road to Petawawa wharf...	463·36	464·12
	Base of C.P.R. rail, at crossing to Petawawa wharf.....	464·21	464·94
	Centre of C.P.R. bridge over Petawawa river.....	459·66	460·39
CCCCXCIX.	On up stream end of W. abutment of bridge over Petawawa river.....	455·52	456·29
	Base of C.P.R. rail, fifth crossing E. of Thistle station.....	482·36	483·09
	Centre of C.P.R. culvert, 117·1 miles W. of Ottawa.....	483·44	484·17
590	On S.W. corner of C.P.R. culvert, 117·1 miles W. of Ottawa.	483·06	483·83
	Base of C.P.R. rail, fourth crossing E. of Thistle station.....	483·45	484·17

VAUDREUIL to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of C.P.R. rail, third crossing E. of Thistle station	498·49	499·23
	Base of C.P.R. rail, second crossing E. of Thistle station	505·12	505·87
	Centre of C.P.R. culvert, 120·2 miles W. of Ottawa	509·84	510·59
589	On S.E. corner of culvert, 120·2 miles W. of Ottawa	509·16	509·93
	Base of C.P.R. rail, first crossing E. of Thistle station	505·47	506·21
	Base of C.P.R. rail, Thistle flag station	508·18	508·92
	Base of C.P.R. rail, opposite B.M. CCCCXCVIII	494·93	495·68
CCCCXCVIII.	On N. end of E. face of culvert, 122·7 miles W. of Ottawa	490·24	491·02
	Base of C.P.R. rail, third crossing E. of Chalk River station	485·52	486·28
588	On S.W. corner, E. end of bridge over Chalk river	483·11	483·90
	Base of C.P.R. rail, centre of bridge over Chalk river	486·52	487·28
	Base of C.P.R. rail, second crossing E. of Chalk River station.	486·44	487·20
	Base of C.P.R. rail, centre of culvert, 125·3 miles W. of Ottawa	493·84	494·59
587	On S.W. corner of culvert, 125·3 miles W. of Ottawa	493·55	494·33
	Base of C.P.R. rail, first crossing E. of Chalk River station	510·76	511·52
	Base of C.P.R. rail, opposite Chalk River station	522·96	523·72
CCCCXCVII.	On S.E. end, stone foundation of turntable, Chalk River	521·45	522·23
	Base of C.P.R. rail, crossing W. end of Chalk River yard	517·84	518·59
594	On S.E. corner of C.P.R. culvert, 2·16 miles N. of Chalk River station	513·45	514·25
	Base of C.P.R. rail, opposite B.M. 594	516·36	517·13
	Base of C.P.R. rail, crossing, 5 miles W. of Chalk River	527·64	528·41
	Base of C.P.R. rail, opposite Wylie station	527·75	528·53
595	On S.W. corner of culvert, 5·27 miles W. of Chalk River	525·21	526·02
	Base of C.P.R. rail, opposite B.M. 595	527·30	528·03
596	On boulder, 15 feet N.E. of track, 100 feet W. of culvert, 6·42 miles W. of Chalk River	526·77	527·58
	Base of C.P.R. rail, opposite B.M. 596	526·51	527·28
DV.	On W. side of S. abutment of bridge over W. branch of Chalk river	526·96	527·76
	Base of rail, centre of bridge, over W. branch of Chalk river	530·30	531·07
597	On N.W. corner of culvert, 8·91 miles W. of Chalk River	534·85	535·67
	Base of C.P.R. rail, opposite B.M. 597	536·85	537·64
	Base of C.P.R. rail, opposite Bass Lake station	587·87	588·66
DVI.	On N.E. corner of culvert, 10·32 miles W. of Chalk River	598·77	599·55
	Base of C.P.R. rail, opposite B.M. DVI	603·09	603·87
598	On boulder, close to N. rail, 12·82 miles W. of Chalk River	692·60	693·42
	Base of C.P.R. rail, opposite B.M. 598	692·54	693·32
599	On rock, S. side of gateway to McGee's hotel, Moor Lake stn.	664·59	665·41
	Base of C.P.R. rail, opposite Moor Lake station	665·59	666·39
DVII.	On rock E. of track, 90 feet S. of mile 16, W. of Chalk River.	634·55	635·37
	Base of C.P.R. rail, opposite B.M. DVII	636·06	636·85
DVIII.	On S. end of W. face of culvert, 19·06 miles W. of Chalk River.	563·63	563·47
	Base of C.P.R. rail, opposite B.M. DVIII	588·87	589·67
	Centre of overhead crossing, 21·12 miles W. of Chalk River.	523·88	524·63
600	On N.W. corner of overhead crossing 21·12 miles W. of Chalk River	522·05	522·88
	Base of C.P.R. rail, third crossing E. of Mackey station	472·94	473·76
601	On S.E. corner of trestle over Mackey creek	443·13	443·98
	Base of C.P.R. rail, centre of trestle over Mackey creek	442.68	443.50
	Base of C.P.R. rail, second crossing E. of Mackey station	437·06	437·87
	Base of C.P.R. rail, first crossing E. of Mackey station	430·16	430·97
	Base of C.P.R. rail, opposite Mackey station	431·07	431·88
DIX.	On rock close to S. rail 300 feet S.E. of mile post 25	427·53	428·38
	C.P.R. bench N of track marked (406·27)	427·87	428·72
	Ottawa river level, May 30, 1905 opposite B.M. DIX	399·57	400·42
	Base of C.P.R. rail, opposite B.M. DIX	424·78	425·60
	Brennan Lake level, May 30, 1905	417·13	417·98
	Base of C.P.R. rail at Rockliffe station	475·88	476·70
DXXI.	On rock, in N. fence line, 100 feet W. of C.P.R. station	474·17	475·02
	Base of C.P.R. rail, at Rockliffe crossing	478·46	479·29
	C.P.R. bench, S. of track, marked (468·99)	490·58	491·44
	Centre of C.P.R. culvert, marked 29·27 miles	484·68	485·50
	Base of rail, centre large culvert, marked 29·39 miles	468·09	468·92
DXX.	On S. end of W. wall of large culvert marked 29·89 miles	464·39	465·25
	C.P.R. bench, marked (471·11)	493·79	494·65
	Base of C.P.R. rail, opposite B.M. DXIX	508·35	509·17
DXIX.	On rock, S. of track, 1,300 feet W. of mile post 32	510·00	510·86
	Base of C.P.R. rail, opposite B.M. 603	551·16	552·00
603	On rock, S. of track, 690 feet E. of culvert, 33·57 miles	552·56	553·43
	Base of C.P.R. rail, opposite B.M. DXVIII	563·47	564·30
DXVIII.	On rock, S. of track, 545 feet W. of mile post 34	564·03	564·89
	C.P.R. bench, S. of track, marked (542·50)	565·05	565·92
	C.P.R. bench, S. of track, marked (584·66)	606·92	607·79
	Base of C.P.R. rail, opposite B.M. DXVII	603·18	604·02
DXVII.	On rock, N. of track, 1,500 feet E. of mile post 37	604·65	604·52
	Base of C.P.R. rail, crossing E. of Bissett station	563·52	564·37
	Base of C.P.R. rail, opposite Bissett station	548·65	549·50
	Base of C.P.R. rail, crossing at Bissett station	547·65	548·49

SESSIONAL PAPER No. 19a

Vaudreuil to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Centre of bridge over Bissett river, marked 38·48 miles	559·41	560·25
DXXV.	On rock, at waters edge, foot of hill, ferry to Quebec shore	450·64	451·51
604	On rock, E. side of main road, 410 feet S. of road to Ottawa river	613·21	614·08
	Base of C.P.R. rail, main road crossing Bissetts	571·73	572·57
	C.P.R. bench, N. of track, marked 552·59	574·77	575·64
	Base of C.P.R. rail, opposite B.M DXVI.	587·90	588·74
DXVI.	On rock, N. of track, 36 feet W. of mile 39, W. of Chalk River	588·37	589·24
	Centre of high trestle, 39·49 miles W. of Chalk River	611·19	612·04
	Base of C.P.R. rail, opposite B.M. DXV.	646·17	647·01
DXV.	On rock, N. of track, 440 feet W. of mile 40, W. of Chalk River.	646·18	647·05
	Centre of C.P.R. culvert, 41·78 miles W. of Chalk River	706·02	706·86
	Base of C.P.R. rail, opposite B.M. DXIV	711·11	711·97
DXIV.	On rock, N. of track, 117 feet E. of mile 42, W. of Chalk River	711·37	712·25
	Centre of C.P.R. culvert, 42·13 miles W. of Chalk River	711·73	712·58
	Centre of C.P.R. culvert, 42·55 miles W. of Chalk River	712·21	713·07
	Centre of C.P.R. culvert, 42·83 miles W. of Chalk River	720·65	721·51
	Base of C.P.R. rail, opposite B.M. DXIII	719·85	720·71
DXIII.	On rock N. of track, 132 feet E. of mile 44, W. of Chalk River.	720·60	721·49
	Centre of C.P.R. culvert 44·19 miles W. of Chalk River	721·41	722·26
	Base of C.P.R. rail, opposite B.M. DXII.	749·47	750·32
DXII.	On rock, S. of track, 70 feet W. of mile post 45	752·44	753·33
	C.P.R. bench, S. of track, marked 723·73	745·53	746·43
	Base of C.P.R. rail, opposite B.M. 602.	698·31	699·18
602	On rock, S. of track, 345 feet W. of mile 47 from Chalk River.	698·68	699·58
	Base of C.P.R. rail, opposite B.M. DXI.	640·32	641·19
DXI.	On rock, N. of track, 720 feet W. of mile 48 from Chalk River.	643·80	644·69
	C.P.R. bench, N. of track, marked (610·64)	632·55	633·44
	Centre of trestle, 50·37 miles W. of Chalk River station	534·23	535 10
	C.P.R. bench, N. of track, marked (492·48)	514·52	515·42
	Base of C.P.R. rail, opposite Deux Rivieres station	519·11	519·99
DXXIV.	On rock, foot of cliff, 500 feet below remains of Ranson's house.	454·44	455·35
605	On rock, mouth of Deux Rivieres	466·51	467·41
	On rock, ¾ mile down Ottawa from B.M. DX	471·86	472·77
	On boulder down N. slope back of B.M DX	504·75	505·66
	Base of C.P.R. rail, opposite B.M DX, Deux Rivieres	513·32	514·20
DX.	On boulder, 10 feet N. of track, 38 feet E. of mile post 51	515·64	516·55
	Base of C.P.R. rail, first crossing W. of Deux Rivieres	497·93	498·80
DXXII.	On rock, 8 feet N. of track, 51·55 miles W. of Chalk River	496·53	497·44
	Base of C.P.R. rail, opposite B.M. DXXII.	496·58	497·45
DXXIII.	On rock, 8 feet S. of track, 1,270 feet E. of mile 53	501·32	502·22
	Base of C.P.R. rail, opposite B.M. DXXIII	500·09	500·96
	C.P.R. bench marked (475·09)	496·87	497·77
	Centre of C.P.R. bridge over brook, marked 54·02 miles	497·23	498·11
606	On boulder, 9 feet S. of track, 280 feet E. of mile 55	498·82	499·72
	Base of C.P.R. rail, opposite B.M. 606	499·30	500·17
	C.P.R. bench marked (487·19)	507·13	508·03
DXXVI.	On rock, 8 feet S. of track, 180 feet E. of mile 56.	510·36	511·28
	Base of C.P.R. rail, opposite B.M. DXXVI.	511·04	511·92
DXXVII.	On rock, 9 feet S. of track, 16 feet W. of mile 57	510·43	511·34
	Base of C.P.R. rail, opposite B.M. DXXVII.	508·40	509·29
DXXVIII.	On boulder, 10 feet S. of track, 525 feet W. of mile 58.	496·75	497·66
	Base of C.P.R. rail, opposite B.M. DXXVIII.	497·92	498·80
607	On rock, 20 feet N. of track, 1,800 feet W. of mile 59	495·21	496·12
	Base of C.P.R., rail, opposite B.M 607	499·43	500·31
DXXIX.	On boulder, 30 feet S. of track, 125 feet E. of mile 60.	493·83	494·76
	Base of C.P.R. rail, opposite B.M. DXXIX.	495·48	496·38
	Centre of C.P.R. bridge over brook, 61·48 miles from Chalk River	523·23	524·12
	C.P.R. bench, marked (501·47)	523·29	524·21
	Base of C.P.R. rail, opposite Klock station.	528·46	529·35
DXXX.	On rock, W. end of Klock station platform	531·44	532·36
DXXXI.	On boulder, 20 feet S. of track, 445 feet E. of mile 63.	565·56	566·48
	Base of C.P.R. rail, opposite B.M. DXXXI	566·55	567·44
	C.P.R. bench, marked (547·32)	569·19	570·11
608	On rock, 6 feet N. of track, 485 feet W. of mile 64	556·31	557·25
	Base of C.P.R. rail, opposite B.M. 608	557·12	558·02
	C.P.R. bench, marked (544·48)	566·35	567·27
DXXXII.	On rock, S. of track, 135 feet W. of mile 66, from Chalk River	568·41	569·34
	Base of C.P.R. rail, opposite B.M. DXXXII	567·03	567·94
DXXXIII.	On rock, 8 feet N. of track, 126 feet E. of mile 68	568·12	569·05
	Base of C.P.R. rail, opposite B.M. DXXXIII	568·25	569·15
609	On rock, 8 feet N. of track, 645 feet W. of mile 69	600·73	601·67
	Base of C.P.R. rail, opposite B.M. 609	601·17	602·09
DXXXIV.	On rock, 10 feet S. of track, 510 feet E. of mile post 70	591·36	592·30
	Base of C.P.R. rail, opposite B.M. DXXXIV	589·93	590·84
DXXXV.	On boulder, N. of track, at mile post 70	563·59	564·54
	Base of C.P.R. rail, opposite B.M. DXXXV	572·32	573·24
DXXXVI.	On boulder, on Ontario shore of Ottawa river, opposite mile 70.	500·53	501·47

VAUDREUIL to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Centre of C.P.R., overhead crossing of main road	569·25	570·17
	Base of C.P.R. rail, first crossing E. of Mattawa station	565·24	566·15
	C.P.R. bench, marked (544·91)	566·88	567·82
DXXXVII.	On flat rock, opposite Mattawa station	563·62	564·56
	Base of rail, opposite Mattawa station	562·41	563·32
	Centre of C.P.R. trestle over brook and road, marked 73·13	555·50	556·42
	Base of C.P.R. rail, second crossing W. of Mattawa station	563·96	564·89
DXXXVIII.	On boulder, 25 feet S. of track, 1,130 feet W. of mile post 74	594·52	595·48
	Base of C.P.R. rail, opposite B.M. DXXXVIII	594·63	595·55
DXXXIX.	On rock, 15 feet S. of track, 485 feet W. of mile post 26	630·43	631·38
	Base of C.P.R. rail, opposite B.M. DXXXIX	628·43	629·35
	C.P.R. bench, marked (610·11)	632·11	633·06
610	On rock, 15 feet S. of track, 460 feet E. of mile post 77	643·69	644·65
	Base of C.P.R. rail, opposite B.M. 610	643·58	644·50
DXL.	On rock, 8 feet N. of track, 505 feet W. of mile post 78	682·52	683·48
	Base of C.P.R. rail, opposite B.M. DXL	681·05	681·98
	Base of C.P.R. rail, W. end of Calvin siding crossing	686·09	687·02
	Base of C.P.R. rail, second crossing W. of Calvin siding	662·21	663·14
DXLI.	On rock, 15 feet N. of track, 600 feet E. of mile 80	629·03	630·00
	Base of rail, opposite B.M. DXLI	628·17	629·11
	Base of rail, centre of culvert, 80·09 miles W. of Chalk River	625·18	626·12
	Base of rail, centre of trestle, 80·54 miles W. of Chalk River	625·12	626·06
	Base of rail, third crossing W. of Calvin siding	624·47	625·40
DXLII.	On rock, 8 feet S. of track, 120 feet W. of mile 83	584·26	585·24
	Base of C.P.R. rail, opposite B.M. DXLII	582·99	583·94
	C.P.R. bench, marked 562·25	584·63	585·58
	Centre of bridge over Amable du Fond river, 83·23 miles	576·73	577·67
	Base of rail, crossing, E. end of Eau Claire siding	588·99	589·94
DXLIII.	On rock, 3 feet N. of track, 1,280 feet E. of mile 84	590·20	591·18
	Base of C.P.R. rail, opposite B.M. DXLIII	590·41	591·39
	C.P.R. bench, marked 565·37	591·65	592·63
	Base of C.P.R. rail, opposite B.M. DXLIII	590·44	591·39
	Base of C.P.R. rail, opposite Eau Claire station	591·77	592·72
	Base of C.P.R. rail, opposite B.M. DLX	623·80	624·75
DLX.	On rock, 12 feet N. of track, 1,025 feet E. of mile post 86	624·48	625·45
	C.P.R. bench, marked (643·99)	666·11	667·09
	Centre of C.P.R. trestle, 86·78 miles W. of Chalk River	663·93	664·88
	Base of C.P.R. rail, opposite B.M. DLIX	660·36	661·32
DLIX.	On rock, 8 feet S. of track, 745 feet E. of mile 87	662·58	663·56
	C.P.R. bench, marked (623·28)	645·74	646·73
	C.P.R. bench, marked (657·37)	679·82	680·81
	C.P.R. bench, marked (681·94)	704·40	705·39
	Base of rail, opposite B.M. DLVIII	702·14	703·10
DLVIII.	On rock, 8 feet S. of track, 2,800 feet E. of mile post 89	703·00	703·99
	Base of C.P.R. rail, opposite B.M. DLVII	756·84	757·80
DLVII.	On rock, 12 feet N. of track, 1,930 feet W. of mile 90	756·65	757·64
	Base of C.P.R. rail, first crossing E. of Rutherglen station	785·65	786·62
	Base of C.P.R. rail at Rutherglen station	788·71	789·68
	Base of C.P.R. rail, first crossing W. of Rutherglen station	785·26	786·23
	Centre of C.P.R. long trestle, 91·43 miles W. of Chalk River	782·44	783·40
	C.P.R. bench, marked (775·21)	799·00	800·00
	Base of C.P.R. rail, opposite B.M. 618	800·86	801·82
618	On rock, 30 feet N. of track, 320 feet E. of mile post 92	800·75	801·75
	Base of C.P.R. rail, third crossing E. of Bonfield station	778·88	779·85
	Centre of C.P.R. long trestle	780·61	781·58
	Base of C.P.R. rail, opposite B.M. DLVI	785·50	786·47
DLVI.	On rock, 8 feet S. of track, 65 feet W. of mile 93	785·50	786·50
	Base of C.P.R. rail, opposite B.M. 617	836·38	837·34
617	On boulder, 8 feet S. of track, 45 feet W. of mile 94	836·42	837·41
	Base of C.P.R. rail, second crossing E. of Bonfield station	842·50	843·47
	Base of C.P.R. rail, first crossing E. of Bonfield station	801·98	802·95
	Base of C.P.R. rail, opposite B.M. DLV	781·99	782·97
DLV.	On rock, 8 feet S. of track, 115 feet E. of mile post 96	784·34	785·34
	Base of C.P.R. rail, opposite B.M. DLIV	775·97	776·94
DLIV.	On boulder, 15 feet S. of track, 140 feet W. of mile post 98	776·04	777·04
	Base of C.P.R. rail, at Bonfield station	781·70	782·68
	Centre of C.P.R. bridge over Nasbonsing river	786·78	787·76
	Base of C.P.R. rail, opposite B.M. 616	787·51	788·49
616	On boulder, 25 feet S. of track, 52 feet E. of mile post 99	784·81	785·81
	C.P.R. bench, marked (758·77)	782·49	783·48
	Base of C.P.R. rail, opposite B.M. DLIII	784·25	785·24
DLIII.	On rock, 30 feet N. of track, 745 feet E. of mile post 100	782·44	783·45
	Base of C.P.R. rail, opposite B.M. 615	788·89	789·87
615	On boulder, 12 feet S. of track at mile post 101	790·13	791·14
	C.P.R. bench, marked (764·71)	788·38	789·37
	Base of C.P.R. rail, opposite B.M. DLII	785·01	785·99
DLII.	On boulder, 8 feet N. of track, 232 feet W. of mile post 102	785·00	786·01
	Base of C.P.R. rail, opposite Nasbonsing station	784·82	785·80
	C.P.R. bench, marked (762·85)	786·50	787·50

SESSIONAL PAPER No. 19a

VAUDREUIL to North Bay, &c.—Complete List of Bench Marks, &c.—*Concluded.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	C.P.R. bench, marked (760·67)	784·67	785·67
	Base of C.P.R. rail, opposite B.M. DLI	782·72	783·72
DLI.	On rock, 10 feet N. of track, 1,008 feet E. of mile 103	783·82	784·84
	Base of C.P.R. rail, first crossing W. of Nasbonsing	783·07	784·07
	C.P.R. bench, marked 754·09	777·66	778·66
	Base of C.P.R. rail, second crossing W. of Nasbonsing	774·36	775·36
	Base of C.P.R. rail, opposite B.M. DL	772·52	773·52
DL.	On rock, 8 feet S. of track, 320 feet E. of mile 105.	773·12	774·14
	Base of C.P.R. rail, opposite B.M. 614	769·73	770·72
614	On boulder, 4 feet N. of track, 46 feet E. of mile 106	770·06	771·09
	Base of C.P.R. rail, opposite B.M. DXLIX	738·96	739·96
DXLIX.	On boulder, 15 feet N. of track, 100 feet W. of mile 107	736·79	737·82
	Base of C.P.R. rail, opposite Corbeil crossing	733·78	734·79
	Base of C.P.R. rail, opposite Corbeil station	733·11	734·12
	C.P.R. bench, marked (699·87)	723·62	724·62
	Base of C.P.R. rail, opposite B.M. DXLVIII	722·45	723·45
DXLVIII.	On rock, 8 feet N. of track, 163 feet W. of mile 109.	721·20	722·24
	Base of C.P.R. rail, opposite B.M. 613.	718·77	719·77
613	On rock, 15 feet S. of track, 125 feet E. of mile post 110.	717·60	718·63
	C.P.R. bench, marked (696·17)	720·09	721·13
	Base of C.P.R. rail, opposite B.M. DXLVII	709·38	710·39
DXLVII.	On rock, 12 feet N. of track, 255 feet E. of mile post 111	709·94	710·98
	Base of C.P.R. rail at Thorncliffe station	699·38	700·39
	Base of C.P.R. rail, opposite B.M. 612.	666·29	667·31
612	On rock, 15 feet S. of track, 473 feet E. of mile post 113.	663·51	664·56
	Base of C.P.R. rail, Nipissing Junction crossing.	673·63	674·65
	Base of C.P.R. rail, junction of G.T.R. to Toronto	674·92	676·25
	Base of C.P.R. rail, second crossing E. of Chippewa creek	672·53	673·64
	C.P.R. bench, marked (642·69)	666·53	667·62
	Base of C.P.R. rail, opposite B.M. DXLVI	664·27	665·32
DXLVI.	On rock, N. of track, 717 feet W. of mile post 114	666·32	667·44
	Base of C.P.R. rail, opposite B.M. 611.	653·54	654·55
611	On rock, 14 feet S. of track, 95 feet E. of mile 115.	653·86	654·93
	C.P.R. bench, marked (630·87)	654·66	655·74
	Base of C.P.R. rail, opposite B.M. DXLV	649·82	650·81
DXLV.	On rock, 8 feet N. of track, 280 feet S. of mile post 116	651·94	652·99
	Centre of C.P.R. culvert, 116·19 miles W. of Chalk River	650·84	651·87
	C.P.R. bench on culvert, 116·19 miles W. of Chalk River (625·65)	649·49	650·55
	Base of C.P.R. rail, first crossing E. of Chippewa creek	651·38	652·37
	Coping, sixth altar step, W. end of S. abutment of Chippewa bridge	643·03	644·08
	Coping, fifth altar step, W. end of S. abutment of Chippewa bridge	645·03	646·08
	Coping, fourth altar step, W. end of S. abutment of Chippewa bridge	647·05	648·10
	Coping, third altar step, W. end of S. abutment of Chippewa bridge.	649·04	650·09
	Coping, second altar step, W. end of S. abutment of Chippewa bridge.	650·96	652·01
	Coping, first altar step, W. end of S. abutment of Chippewa bridge.	652·98	654·03
	Centre of C.P.R. bridge over Chippewa creek, North Bay	653·00	654·05
I.	Inside edge coping, fourth altar step, W. end of S. abutment of bridge.	645·01	646·05
DXLIV.	On W. end of S. abutment of bridge over Chippewa creek	649·66	650·71

TORONTO TO NORTH BAY VIA NEWMARKET, BARRIE, COLLINGWOOD, ORILLIA, MIDLAND, GRAVENHURST, BURK'S FALLS AND NIPISSING JUNCTION.

Bench Marks.	Location and Description.	Elevations. Instrumental.	Adjusted.
DCXIII.	On base, 24 feet from S. end of James St. face of Toronto City Hall..	296·96	296·96
	S. end of door step (level with basement floor), James St. entrance Toronto City Hall.....	296·99	296·99
645	On pavement, close to S.W. corner of Government armouries, Toronto.....	301·64	301·64
	Street level, intersection of Queen and Simcoe streets, Toronto.	295·66	295·66
	Street level, intersection of King and Simcoe streets, Toronto.	280·16	280·16
DCXIV.	On W. face of buttress at S.W. corner of old Union station, Toronto.....	255·69	255·69
645¼	Top of plinth, fourth small buttress E. of tower, S. side old Union station.....	258·62	258·62
	Base of S. rail of track No. 5, opposite exit of old Union station.	254·30	254·30
DCXV.	On W. base of fourth pier from N. abutment of bridge, foot of John street.....	254·33	254·33
	Base of S. rail of first track N. of of John street bridge.....	252·94	252·94
	Floor level, centre of John street bridge, Toronto.....	279·69	279·69
DCXVI.	Opposite second altar step from ground, N. face E. end of S. abutment, Spadina bridge.....	257·46	257·46
	Base of G.T.R. rail under bridge, foot of Spadina avenue....	254·81	254·81
	Floor level, centre of bridge, foot of Spadina avenue.....	277·82	277·82
	Base of G.T.R. rail at level crossing of Spadina avenue.....	254·38	254·38
DCXVII.	On E. end of S. face of N. abutment of bridge, foot of Bathurst street.....	271·57	271·57
'12'	City Eng. bench, E. face of N. abutment of bridge, foot of Bathurst street.....	275·04	275·04
	Base of G.T.R. rail, under bridge, foot of Bathurst street....	256·19	256·19
	Floor level, centre of bridge, foot of Bathurst street.....	281·09	281·09
646	On small boulder, 6 feet from S. face W. end of Queen's wharf, Toronto.....	251·28	251·28
	Zero of G.B. ship canal survey automatic gauge, summer of 1906	242·87	242·87
	Zero of Toronto Hbr. Com'rs. gauge on S. face of Queen's wharf	245·00	245·00
	Zero of P.W. Dept. automatic gauge on Queen's wharf . .	243·28	243·28
645¾	On top of Toronto Hbr. Com'rs. gauge at 4·45 feet....	249·45	249·45
647	On S.W. corner of coping at portal of sewer opposite Queen's wharf.....	254·44	254·44
	Base of N. rail of G.T.R. main track at Strachan ave., Toronto	278·36	278·36
	Base of S. rail of C.P.R. main track at Strachan ave., Toronto	279·11	279·11
	Street level, intersection of Strachan ave. and Queen street..	295·20	295·20
DCXVIII.	Under window, keeper's house, E. entrance, Prov. Insane Asylum..	297·64	297·64
648	Base of W. pillaster, keeper's house, E. entrance, Prov. Insane Asylum.....	298·04	298·04
	Street level, opposite B.M. 648.....	296·56	296·56
DCXIX.	On W. base, 31·8 feet from rear of Trinity College, Toronto..	304·68	304·68
649	On coping, S.E. corner of King street subway.....	293·96	293·96
	Base of G.T.R. rail, over centre of King street, Toronto.....	291·89	291·89
	Base of G.T.R. rail, opposite N. Parkdale station.....	304·30	304·30
	Base of C.P.R. rail, opposite Parkdale station.....	305·36	305·36
	Base of G.T.R. main track, over Queen street.....	306·46	306·46
650	On coping of N. wall of Queen St. subway, close to G.T.R. east rail.....	306·14	306·14
651	On bridge seat, N. wall of Queen St. subway, close to G.T.R. east rail.....	303·16	303·16
	Base of C.P.R. rail at Brock ave., Toronto.....	317·58	317·58
	Base of G.T.R. rail at Brock ave., Toronto.....	319·87	319·87
	Base of G.T.R. rail at North Bay line at Brock street.....	316·45	316·45
DCXX.	On base, centre of E. face of W. abutment of bridge, Dundas street.....	352·94	352·94
	Base of G.T.R. rail, under Dundas street bridge.....	350·74	350·74
	Base of C.P.R. rail, under Dundas street bridge.....	350·59	350·59
	Floor level, centre of Dundas street bridge.....	375·00	375·00
"121"	City Eng. bench on W. end of iron truss, W. end of W. side Dundas bridge.....	377·08	377·08
	Base of G.T.R. rail, at Bloor street crossing.....	370·53	370·53
	Base of C.P.R. rail, at Bloor street crossing.....	372·07	372·07
	Base of G.T.R. rail, Royce Avenue crossing.....	389·45	389·45
	Base of C.P.R. rail, at Royce Avenue.....	389·20	389·20
	Base of G.T.R. rail at crossing of C.P.R. line to N. Toronto..	396·40	396·40
	Base of C.P.R. rail at Toronto Junction station.....	394·17	394·17

SESSIONAL PAPER No. 19a

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
DCXXI.	On N. stone base, S. end of bridge over Weston road.	396·63	396·63
	Base of C.P.R. rail, under bridge over Weston road.	394·97	394·97
	Base of C.P.R. rail, Osler Avenue crossing.	396·70	396·70
652	On E. end of S. wall of C.P.R. culvert, 18 ft. W. of G.T.R. line to North Bay.	393·87	393·87
	Base of C.P.R. rail, at crossing of G.T.R. line to North Bay.	398·18	398·18
	Base of C.P.R. rail, at crossing of Landsdowne Avenue.	398·05	398·05
	Base of C.P.R. rail, at crossing of Dufferin Avenue.	399·97	399·97
	Base of C.P.R. rail, at crossing of Bartlett Avenue.	401·65	401·65
	Base of C.P.R rail, at crossing of Dovercourt Avenue.	402·89	402·89
653	On W. end of S. wall of culvert at Ossington Avenue.	400·74	400·74
	Base of C.P.R. rail, at crossing of Ossington Avenue.	402·67	402·67
	Base of C.P.R. rail, at crossing at Shaw street.	402·46	402·46
	Base of C.P.R. rail, at crossing of Bathurst street.	404·92	404·92
	Base of C.P.R. rail, at crossing of Newport road.	406·47	406·47
	Base of C.P.R. rail, at crossing of Avenue road.	401·31	401·31
	Base of C.P.R. rail, at crossing of North Toronto station.	403·85	403·85
654	On W. end of step, 1st door E. of bay window, North Toronto station.	405·73	405·73
DCXXII.	On base E. face of North Toronto station.	407·26	407·26
	Base of C.P.R. rail, at crossing of Yonge street.	405·51	405·51
	Street level, intersection of Bloor street and Queen's park driveway.	375·89	375·89
	Pavement centre porch W. entrance of Parliament Buildings.	359·70	359·70
DCXXIII.	On base, 28 ft. from front W. face of Parliament Buildings.	359·65	359·65
	Pavement, foot main entrance steps of Parliament Buildings.	359·85	359·85
	Floor level, main entrance of Parliament Buildings.	368·82	368·82
DCXXIV.	On base between 2nd and 3rd window, N. end of T.U.B. Dept. building.	347·79	347·79
	Street level, intersection of College Avenue and Queen's Park driveway.	333·92	333·92
	Base of G.T.R. rail, at crossing of Davenport road.	412·67	412·67
	Base of G.T.R. rail, at Davenport station.	414·75	414·75
	Base of G.T.R. rail, at crossing of Ste. Claire Avenue.	426 23	426 23
DCXXV.	On S. face of E. end of G.T.R. culvert, at the worsted and braid factory.	432·60	432·60
	Base of G.T.R. rail, opposite B.M. DCXXV.	440 11	440·11
	Base of G.T.R. rail, under Fairbank road crossing.	495·67	495·68
655	On N. end of E. wall of culvert, 1,500 ft. S. of Downsview station.	547·21	547·22
	Base of G.T.R. rail, opposite B.M. 655.	556·21	556·22
	Base of G.T.R. rail, at Downsview flag station.	576·13	576·14
	Base of G.T.R. rail, at Downsview crossing.	576·78	576·79
DCXXVI.	On N. end of E. wall of culvert, 130 ft. N. of N. end of Downsview siding.	567·82	567·84
	Base of G.T.R. rail, opposite B.M. DCXXVI.	580·07	580·09
	Base of G.T.R. rail, at Downsview flag station.	613·16	613·18
	Base of G.T.R. rail, at Downsview crossing.	613·95	613·97
656	On W. end coping of culvert, 300 ft. S. of road to Lansing.	643·80	643·82
	Base of G.T.R. rail, opposite B.M. 656.	646·71	646·73
	Base of G.T.R. rail, at cross road to Lansing.	644·99	645·01
DCXXVII.	On N. end of E. wall of culvert, ⅓ mile S. of Elia flag station.	632 26	632 29
	Base of G.T.R. rail, opposite B.M. DCXXVII.	638·75	638·78
657	On N.E. corner of culvert, ¼ mile S. of Elia flag station.	638·15	638·18
	Base of G.T.R. rail, opposite B.M. 657.	639·06	639·09
	Base of G.T.R. rail, opposite Elia flag station.	643·76	643·79
	Base of G.T.R. rail, opposite Elia crossing.	648·49	648·52
658	Centre of coping, E. end of culvert, opposite James Brocks' property.	652·33	652·37
	Base of G.T.R. rail, opposite B.M. 658.	662·24	662·28
	Base of G.T.R. rail, at 1st crossing of Vaughan township.	656·87	656·91
DCXXVIII.	On S. inner face of top of W. end of culvert, at Thornhill crossing.	623·82	623·86
659	On S. end of W. wall of culvert, S. of Thornhill crossing.	624 79	624 83
	Base of G.T.R. rail, opposite B.M. 659.	630·57	630·61
	Base of G.T.R. rail, at Thornhill crossing.	629·74	629·78
	Base of G.T.R. rail, at Thornhill station.	630 19	630·23
660	On S. end of E. wall of culvert, 1 mile N. of Thornhill station.	654·87	654·92
	Base of G.T.R. rail, opposite B.M. 660.	663 83	663 88
	Base of G.T.R. rail, 1st crossing N. of Thornhill station.	667·12	667·17
DCXXIX.	On S. end of E. wall of culvert, opposite lot 15, Keffer's property.	712·49	712·54
	Base of G.T.R. rail, opposite B.M. DCXXIX.	716·93	716·98
	Base of G.T.R. rail, at crossing to Carpville.	724·38	724·43
	Base of G.T.R. rail, at crossing to Maple.	803·00	803·06
	Base of G.T.R. rail, at Maple station.	812 76	812·82
	Base of G.T.R. rail, 1st crossing N. of Maple station.	879·42	879·48
	Base of G.T.R. rail, 2nd crossing N. of Maple station.	891·74	891·80
DCXXX.	On W. face of culvert, 115 ft. N. of mile post 26½	911·85	911·92

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, opposite B.M. DCXXX	934·83	934·90
	Base of G.T.R. rail, 3rd crossing N. of Maple station	957·39	957·46
661	On S. end of E. wall of culvert, opposite lot 31, con. IV, Vaughan township.	958·33	958·40
	Base of G.T.R. rail, opposite B.M. 661	970·02	970·09
	Base of G.T.R. rail, 4th crossing N. of Maple station	980·97	981·05
	Base of G.T.R. rail, opposite King station	956·38	956·46
	Base of G.T.R. rail, opposite King crossing	957·43	957·51
DCXXXI.	On N. end of W. face of culvert, 1,300 ft. N. of King station	947·50	947·58
	Base of G.T.R. rail, opposite B.M. DCXXXI	963·72	963·80
	Base of G.T.R. rail, 2nd crossing N. of King station	977·76	977·84
	Base of G.T.R. rail, 3rd crossing N. of King station	979·62	979·70
DCXXXII.	On S. end of W. wall of culvert, 150 ft. S. of mile 24–203	961·37	961·45
	Base of G.T.R. rail, opposite B.M. DCXXXII	970·10	970·18
	Base of G.T.R. rail, 4th crossing N. of King station	960·21	960·30
DCXXXIII.	On N. end of W. wall of culvert, 1,060 ft. N. of mile 25–202	944·65	944·74
	Base of G.T.R. rail, opposite B.M. DCXXXIII	953·44	953·53
	Base of G.T.R. rail, at crossing of Schomberg railway	979·40	979·49
	Base of G.T.R. rail, 5th crossing N. of King station	986·96	987·05
	Base of G.T.R. rail, 6th crossing N. of King station	1,002·17	1,002·26
DCXXXIV.	On W. end of N. wall of culvert, 450 ft. S. of mile 28–199	965·64	965·74
	Base of G.T.R. rail, opposite B.M. DCXXXIV	971·04	971·14
	Base of G.T.R. rail, 7th crossing N. of King station	935·64	935·74
	Base of G.T.R. rail, at Yonge street crossing	932 72	932·82
662	On N.E. base of support, at Metropolitan Electric Railway crossing.	930·75	930·85
663	On N.W. base of support, at Metropolitan Electric Railway crossing.	930·75	930·85
	Base of G.T.R. rail, under centre of Metropolitan Railway	929·10	929·20
DCXXXV.	4·7 ft. from S.E. corner of Aurora shoe factory	884·65	884·76
	Base of G.T.R. rail, opposite Aurora station	882·68	883·79
	Base of G.T.R. rail, at Wellington street crossing	882 88	882·99
DCXXXVI.	On W. end of N. wall of culvert, 735 ft. N. of mile 31–196	843·61	843 72
	Base of G.T.R. rail, opposite B.M. DCXXXVI	850·78	850·89
	Base of G.T.R. rail, main road crossing	831·70	831·81
DCXXXVII.	On W. end of S. wall of culvert, 1,270 ft. S. of mile 32–195	807·71	807·83
	Base of G.T.R. rail, opposite B.M. DCXXXVII	818·66	818·78
DCXXXVIII.	On W. end of S. wall of culvert, 2,260 ft. N. of mile 32–195	809·13	809·25
	Base of G.T.R. rail, opposite B.M. DCXXXVIII	812·50	812·62
	Base of G.T.R. rail, at crossing	805·26	806·08
	Base of G.T.R. rail, at crossing of Water street	787·72	787·84
	Base of G.T.R. rail, at crossing of Timothy street	781·84	781·97
	Centre of G.T.R. bridge, over Holland river at Newmarket	781·01	781·14
DCXXXIX.	On E. face of N. abutment of G.T.R. bridge over Holland river.	777·28	777·41
	Base of G.T.R. rail, under overhead crossing, Queen street	773·05	773·18
	Base of G.T.R. rail, opposite Newmarket station.	769·83	769·96
	Base of G.T.R. rail, 1st crossing N. of Newmarket station	770·35	770·48
	Base of G.T.R. rail, 2nd crossing N. of Newmarket station	766·17	766·30
	Base of G.T.R. rail, 3rd crossing N. of Newmarket station.	762·56	762·69
	Base of G.T.R. rail, under overhead crossing	761·00	761·14
DCLV.	On base of N.E. support of overhead crossing.	761·67	761·81
	Base of G.T.R. rail, 4th crossing S. of Holland Landing station.	756·43	756·57
	Base of G.T.R. rail, opposite B.M. DCLIV	745·85	745·99
DCLIV.	On E. face of culvert, 2,150 ft. S. of mile post 38–179	740·66	740·80
	Base of G.T.R. rail, 3rd crossing S. of Holland Landing station	745·59	745·73
	Base of G.T.R. rail, 2nd crossing S. of Holland Landing station	742·96	743·10
	Base of G.T.R. rail, 1st crossing S. of Holland Landing station	741·54	741·68
	Base of G.TR. rail, opposite Holland Landing station	741·56	741·70
666½	Brass headed nail on W. side of track, N. side of crossing	738·40	738·54
	Base of G.T.R. rail, 7th crossing S. of Bradford station	741·19	741·33
	Base of G.T.R. rail, 6th crossing S. of Bradford station	740·91	741.06
	Base of G.T.R. rail, 5th crossing S. of Bradford station	741·58	741·73
	Base of G.T.R. rail, 4th crossing S. of Bradford station	737·73	737·88
	Base of G.T.R. rail, 3rd crossing S. of Bradford station	734·32	734·47
	Base of G.T.R. rail, 2nd crossing S. of Bradford station	727·81	727·96
	Base of G.T.R. rail, 1st crossing S. of Bradford station.	724·57	724·73
	Base of G.T.R. rail, centre of bridge over Holland river	724·40	724·56
	Base of G.T.R. rail, opposite Bradford station	724·11	724·27
	Base of G.T.R. rail, opposite B.M. DCLIII	733·25	733·41
DCLIII.	On W. face of culvert, 570 ft. N. of mile 43–184	726·16	726·32
	Base of G.T.R. rail, opposite B.M. 666	737·96	738·13
666	On E. end of S. wall, culvert 1,785 ft. N. of mile post 45–182	737·04	737·21
	Base of G.T.R. rail, 5th crossing S. of Gilford station	740.21	740.38
	Base of G.T.R. rail, 4th crossing S. of Gilford station	742·23	742·41
	Base of G.T.R. rail, opposite B.M. DCLII	746·10	746.28
DCLII.	On W. face of culvert, 990 ft. S. of mile post 46–181	742·05	742.23

SESSIONAL PAPER No. 19a

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of C.P.R. rail, 3rd crossing S. of Gilford station.....	739·52	739·69
	Base of C.P.R. rail, 2nd crossing S. of Gilford station....	755·37	755·55
	Base of C.P.R. rail, opposite B.M. DCLI.....	754·51	754·70
DCLI.	On W. face of culvert, 400 ft. S. of mile post 48–179.	751·24	751·43
	Base of G.T.R. rail, 1st crossing S. of Gilford station.....	754·97	755·16
	Base of G.T.R. rail, opposite Gilford station.....	750·47	750·66
	Base of G.T.R. rail, first crossing N. of Gilford station....	750·31	750·50
	Base of G.T.R. rail, second crossing N. of Gilford station....	750·08	750·27
665½		720·99	721·18
	Base of G.T.R. rail, opposite B.M. DCL.....	750·73	750·97
DCL.	On W. face of culvert, 2,485 feet S. of mile post 50–177.....	747·49	747·68
	Base of G.T.R. rail, opposite crossing.....	777·78	777·98
	Base of G.T.R. rail, opposite B.M. DCXLIX.....	777·65	777·85
DCXLIX.	On W. face of culvert, 1,785 feet N. of mile post 50–177.....	775·02	775·22
	Base of G.T.R. rail, opposite crossing.....	759·62	759·82
	Base of G.T.R. rail, opposite B.M. DCXLVIII.....	759·54	759·74
DCXLVIII.	On S. end of W. face of culvert, 980 feet N. of mile 51–176...	754·84	755·04
	Base of G.T.R. rail, opposite Lefroy station.....	768·80	769·00
	Base of G.T.R. rail, opposite Lefroy crossing.....	764·99	765·19
	Base of G.T.R. rail, opposite B.M. DCXLVII.....	761·78	761·98
DCXLVII.	On N.E. corner of culvert, 188 feet N. of mile 52–175.....	757·50	757·70
	Base of G.T.R. rail, opposite B.M. 665.....	766·63	766·84
665	On centre of W. end of culvert, 1,900 feet S. of mile 53–174:.	765·75	765·96
	Base of G.T.R. rail, sixth crossing S. of Craigvale station.....	774·58	774·79
	Base of G.T.R. rail, opposite B.M. DCXLVI.....	778·48	778·69
DCXLVI.	On N. end of E. face of culvert, 2,085 feet S. of mile 54–173..	769·06	769·27
	Base of G.T.R. rail, under overhead crossing.....	792·68	792·89
	Base of G.T.R. rail, opposite B.M. DCXLV.....	819·86	820·07
DCXLV.	On N. end of E. face of culvert, 1,845 feet S. of mile 55–172..	813·43	813·64
	Base of G.T.R. rail, fifth crossing, S. of Craigvale station.....	819·67	819·88
	Base of G.T.R. rail, fourth crossing S. of Craigvale station...	869·53	869·75
	Base of G.T.R. rail, third crossing S. of Craigvale station.....	875·12	875·34
	Base of G.T.R. rail, opposite B.M. DCXLIV.....	896·27	896·49
DCXLIV.	On boulder, 6 feet W. of track, 836 feet N. of mile 56–171....	895·33	895·55
	Base of G.T.R. rail, second crossing, S. of Craigvale station..	887·04	887·26
	Base of G.T.R. rail, opposite B.M. DCXLIII.....	876·94	877·17
DCXLIII.	On N. end of W. face of culvert, 1,200 feet S. of Craigvale station.....	866·24	866·47
	Base of G.T.R. rail, at Craigvale station crossing.....	877·70	877·93
	Base of G.T.R. rail at Craigvale station.....	879·31	879·54
	Base of G.T.R. rail, first crossing N. of Craigvale station..	875·77	876·00
	Base of G.T.R. rail, second crossing N. of Craigvale station	852·13	852·37
	Base of G.T.R. rail, opposite B.M. DCXLII.....	846·50	846·74
DCXLII.	On N. end of W. face of culvert, 665 feet S. of mile post 60–167.	839·12	839·36
	Base of G.T.R. rail, opposite B.M. 664.....	840·18	840·42
664	On N.W. base of overhead crossing, 2,540 feet S. of mile 61–166	840·43	840·67
	Centre of bridge over Lovers creek.....	793·83	794·07
DCXLI.	On W. end of N. abutment of bridge over Lovers creek.....	789·41	789·65
	Base of G.T.R. rail, under first overhead crossing.....	782·44	782·68
	Base of G.T.R. rail, first crossing S. of Allandale station.....	759·21	759·46
	Base of G.T.R. rail, opposite Allandale station.....	734·17	734·42
	Base of G.T.R. rail, opposite Barrie station.....	725·65	725·92
DCXL.	On base, centre of rear wall of Barrie post office.....	732·18	732·44
DCLVI.	On N.W. foundation of James Groghon's house, Dunlop street.	758·56	758·82
	Base of G.T.R. rail, fourth crossing E. of Colwell Junction...	766·31	766·58
	Base of G.T.R. rail, third crossing E. of Colwell Junction....	762·23	762·51
	Base of G.T.R. rail, second crossing E. of Colwell Junction...	746·98	747·26
DCLVII.	On S. end of W. wall of culvert, 153 feet E. of semaphore, Colwell.....	732·51	732·79
	Base of G.T.R. rail, opposite B.M. DCLVII.....	737·58	737·86
	Base of G.T.R. rail, first crossing E. of Colwell station.....	744·50	744·78
	Base of G.T.R. rail, opposite Colwell station.....	748·09	748·37
	Base of G.T.R. rail, first crossing W. of Colwell station.....	717·63	717·92
	Base of G.T.R. rail, crossing of C.P.R. to Sudbury.....	703·72	704·01
	Base of G.T.R. rail, opposite Utopia station.....	691·15	691·45
	Base of G.T.R. rail, opposite Utopia crossing.....	690·58	690·88
DCLVIII.	On S. end of E. wall of culvert, 900 feet E. of mile 72–43....	639·86	640·16
	Base of G.T.R. rail, opposite B.M. DCLVIII.....	658·16	658·46
	Base of G.T.R. rail, second crossing W. of Utopia station....	645·74	646·04
DCLIX.	On S. face of E. abutment of bridge over Nottawasaga river..	628·83	629·13
	Centre of G.T.R. bridge over Nottawasaga river.....	630·48	630·78
	Base of G.T.R. rail, first crossing E. of Angus station.....	629·42	629·72
DCLX.	On S. face of E. abutment of bridge over Pine river.....	621·28	621·59
	Centre of G.T.R. bridge over Pine river.....	623·10	623·42
	Base of G.T.R. rail, opposite station, Angus.....	626·99	627·30
	Base of G.T.R. rail, opposite crossing, Angus.....	625·73	626·04
	Base of G.T.R. rail, second crossing W. of Angus station.....	625·69	626·00
	Base of G.T.R. rail, third crossing W. of Angus station.....	633·19	633·50
	Centre of G.T.R. bridge over Mad river.....	627·06	627·37

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
DCLXI.	On S. face of W. abutment, bridge over Mad river	625·52	625·83
	Base of G.T.R. rail, first crossing E. of Brentwood station	624·43	624·74
	Base of G.T.R. rail, opposite Brentwood station	645·23	645·55
	Base of G.T.R. rail, opposite Brentwood crossing	645·91	646·23
	Base of G.T.R. rail, second crossing W. of Brentwood	652·63	652·95
	Base of G.T.R. rail, third crossing W. of Brentwood,	666·53	666·85
DCLXII.	On S. end of E. face of culvert over Cooks brook	655·41	655·73
	Base of G.T.R. rail, opposite B.M. DCLXII	679·63	679·96
	Base of G.T.R. rail, New Lowell crossing	684·27	684·60
	Base of G.T.R. rail, New Lowell station	687·09	687·42
	Base of G.T.R. rail, first crossing W. of New Lowell station	705·40	705·73
	Base of G.T.R. rail, second crossing W. of New Lowell station.	720·07	720·40
	Base of G.T.R. rail, third crossing W. of New Lowell station.	727·09	727·43
	Base of G.T.R. rail, fourth crossing W. of New Lowell station.	722·12	722·46
DCLXIII.	On W. face of boulder, 2,590 feet N. of mile post 82–33	710·92	711·26
	Base of G.T.R. rail, opposite B.M. DCLXIII	714·60	714·94
	Base of G.T.R. rail, fifth crossing W. of New Lowell station	715·88	716·22
	Base of G.T.R. rail, sixth crossing W. of New Lowell station.	711·49	711·84
	Base of G.T.R. rail, seventh crossing W. of New Lowell station.	710·40	710·75
	Base of G.T.R. rail, eighth crossing W. of New Lowell station.	711·22	711·57
DCLXIV.	On S. end of E. wall of culvert, 237 feet E. of mile 85–30	700·05	700·40
	Base of G.T.R. rail, opposite B.M. DCLXIV	711·83	712·18
	Base of G.T.R. rail, first crossing E. of Stayner station	713·41	713·77
	Base of G.T.R. rail, opposite Stayner station	713·51	713·87
	Base of G.T.R. rail, first crossing W. of Stayner station	713·50	713·86
DCLXV.	On S. end of E. wall of culvert, 755 feet W. of mile 86–29	702·46	702·82
	Base of G.T.R. rail, opposite B.M. DCLXV	711·46	711·82
	Base of G.T.R. rail, second crossing W. of Stayner station	713·55	713·91
	Base of G.T.R. rail, third crossing W. of Stayner station	713·74	714·10
667	On boulder, 10 feet S. of track, 1,645 feet W. of mile 88–27	718·23	718·60
	Base of G.T.R. rail, opposite B.M. 667	719·03	719·40
	Base of G.T.R. rail, fourth crossing W. of Stayner station	719·39	719·76
	Base of G.T.R. rail, fifth crossing W. of Stayner station	719·79	720·16
	Base of G.T.R. rail, sixth crossing W. of Stayner station	699·16	699·54
DCLXVI.	On S. face of E. abutment of bridge over Batteaux river	685·62	686·00
	Centre of bridge over Batteaux river	686·03	686·41
	Base of G.T.R. rail, at Batteaux crossing	685·18	685·56
	Base of G.T.R. rail at Batteaux station	684·23	684·61
	Base of G.T.R. rail, first crossing W. of Batteaux station	676·49	676·87
	Base of G.T.R. rail, second crossing W. of Batteaux station	640·62	641·01
DCLXVII.	On S.E. corner of E. wall of bridge over Pretti river	637·73	638·12
	Centre of bridge over Pretti river	637·69	638·08
	Base of G.T.R. rail at Hume street, Collingwood	604·75	605·14
	Base of G.T.R. rail at Ontario street, Collingwood	595·18	595·58
DCLXVIII.	On base, front of Collingwood station	590·55	590·95
	Base of G.T.R. rail, opposite Collingwood station	589·32	589·72
DCLXIX.	On S.E. corner of Collingwood dock pumphouse	584·79	585·19
668½	Iron rivet, N.E. corner of Collingwood dock pumphouse	587·40	587·80
	Zero of G.B.S.C., Survey automatic gauge, summer of 1906	581.74	581.74
	Base of G.T.R. rail at Mulcaster street crossing	722·92	723·18
668	On timber, W. end of culvert, 2,570 feet E. of mile 64–163	719·11	719·37
DCLXX.	On S. face of E. wall of culvert, 360 feet E. of mile 65–162	732·57	732·83
	Base of G.T.R. rail, opposite B.M. DCLXX	734·47	734·73
DCLXXI.	On S. face of W. abutment of culvert, 625 feet W. of mile 66–161	744·92	745·18
	Centre of overhead crossing	747·64	747·90
	Base of G.T.R. rail, first crossing W. of Barrie	758·41	758·67
DCLXXII.	On N. face of W. wall of culvert, 730 feet E. of mile 67–260	762·32	762·59
	Base of G.T.R. rail, opposite B.M. DCLXXII	771·14	771·41
	Base of G.T.R. rail, second crossing W. of Barrie	777·15	777·42
	Base of G.T.R. rail, third crossing W. of Barrie	788·46	788·73
DCLXXIII.	On S. face of E. wall of culvert, 1,760 feet E. of mile 68–159	789·41	789·68
	Base of G.T.R. rail, opposite B.M. DCLXXIII	791·71	791·98
	Base of G.T.R. rail, opposite Parklands station	799·86	800·13
	Base of G.T.R. rail, opposite Parklands crossing	801·53	801·80
	Base of G.T.R. rail, second crossing W. of Parklands	811·38	811·66
	Base of G.T.R. rail, third crossing W. of Parklands	817·52	817·80
	Base of G.T.R. rail, opposite Gowan station	817·35	817·63
DCLXXIV.	On N. face of W. wall of culvert, 25 feet E. of mile 70–157	813·12	813·40
	Base of G.T.R. rail, opposite B.M. DCLXXIV	817·03	817·31
	Base of G.T.R. rail, first crossing W. of Gowan station	834·54	834·82
	Base of G.T.R. rail, second crossing W. of Gowan station	815·52	815·81
DCLXXV.	On S. end of E. wall of culvert, 720 feet W. of mile 72–155	797·69	797·98
	Base of G.T.R. rail, opposite B.M. DCLXXV	804·97	805·26
	Base of G.T.R. rail, third crossing W. of Gowan station	795·04	795·33
DCLXXVI.	On N. end of W. wall of culvert, 1,095 feet E. of mile 73–154	773·84	774·13
	Base of G.T.R. rail, opposite B.M. DCLXXVI	782·58	782·87
	Base of G.T.R. rail, fourth crossing W. of Gowan station	779·22	779·51
669	On N. end of E. wall of culvert	779·15	779·45

SESSIONAL PAPER No. 19a

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, opposite B.M. 669	780·88	781·18
	Base of G.T.R. rail, at Oro station crossing	788·88	789·18
	Base of G.T.R. rail at Oro station	789·01	789·31
DCLXXVII.	On S. end of E. wall of culvert, 2,434 feet W. of mile 76–151.	796·24	796·54
	Centre of culvert at B.M. DCLXXVII	800·86	801·16
	Base of G.T.R. rail, first crossing W. of Oro station	797·63	797·94
DCLXXVIII.	On N. end of W. wall of culvert, 1,935 feet W. of mile 77–150	796·67	796·98
	Centre of culvert at B.M. DCLXXVIII	799·50	799·81
	Base of G.T.R. rail, second crossing W. of Oro station	795·91	796·22
DCLXXIX.	On S. end of W. wall of culvert, 170 feet E. of mile 78–149	779·09	779·40
670	On S. end of W. wall of culvert, 170 feet E. of mile 78–149	781·11	781·91
671	On S. end of W. wall of culvert, 170 feet E. of mile 78–149	781·10	781·42
	Centre of culvert, 170 feet E. of mile 78–149	781·60	781·91
	Base of G.T.R. rail, opposite Hawkestone crossing	781·11	781·42
	Base of G.T.R. rail, opposite Hawkestone station	780·12	780·43
	Base of G.T.R. rail, first crossing N. of Hawkestone station	784·30	784·62
	Base of G.T.R. rail, second crossing N. of Hawkestone station	793·47	793·79
DCLXXX.	On N. face of E. end of culvert, 1,132 feet W. of mile post 80–147	791·10	791·42
	Base of G.T.R. rail at B.M. DCLXXX	796·08	796·40
	Base of G.T.R. rail, crossing between Oro and Orillia townships	815·51	815·84
DCLXXXI.	On E. end of N. wall of culvert, 1,435 feet N. of mile 82–145	733·06	733·39
	Base of G.T.R. rail at B.M. DCLXXXI	737·01	737·34
	Base of G.T.R. rail, third crossing, N. of Oro station	732·48	732·81
	Base of G.T.R. rail, fourth crossing N. of Oro station	723·62	723·96
DCLXXXII.	On base, 4½ feet from W. corner, front of W. wing of Orillia Insane Asylum	785·68	786·02
	Base of G.T.R. rail, opposite platform of Orillia Insane Asylum	729·36	729·70
	Base of G.T.R. rail, first crossing N. of platform of Orillia Insane Asylum	723·88	724·23
	Base of G.T.R. rail, second crossing N. of platform of Orillia Insane Asylum	724·73	725·08
	Base of G.T.R. rail, third crossing N. of platform of Orillia Insane Asylum	723·84	724·19
	Base of G.T.R. rail at Front street crossing, Orillia	724·44	724·79
	Base of G.T.R. rail at Orillia station	723·46	723·81
673	On W. end of wooden culvert, 450 feet N. of Orillia station	721·37	721·72
	Base of G.T.R. rail, opposite B.M. 672	726·34	726·69
	Base of G.T.R. rail, first crossing N. of Orillia station	734·67	735·02
	Base of G.T.R. rail, second crossing N. of Orillia station	728·02	728·37
	Base of G.T.R. rail, third crossing N. of Orillia station	726·49	726·84
	Centre of G.T.R., over Narrows, Couchiching lake	726·71	727·06
674	On S.E. corner of concrete turntable, Atherley highway bridge.	721·91	722·26
	Centre of highway bridge, Narrows, Lakes Couchiching-Simcoe	727·08	727·43
	Base of G.T.R. rail at Atherley junction	725·79	726·14
DCLXXXIII.	On E. end of N. wall of culvert, 162 feet N. of mile post 90–137.	724·68	725·03
675	On E. end of N. wall of culvert, 162 feet N. of mile post 90–137.	727·16	727·51
676	On E. end of N. wall of culvert, 162 feet N. of mile post 90–137.	727·12	727·47
	Base of G.T.R. rail, opposite B.M. DCLXXXIII	727·42	727·77
	Base of G.T.R. rail, main road crossing	727·54	727·89
	Base of G.T.R. rail, third crossing S. of Rama station	730·86	731·21
DCLXXXIV.	On E. end of S. wall, 1,055 feet S. of mile 91–136	722·53	722·87
	Base of G.T.R. rail, opposite B.M. DCLXXXIV	725·79	726·13
	Base of G.T.R. rail, second crossing S. of Rama station	736·73	737·07
DCLXXXV.	On W. end of S. wall of culvert, 775 feet N. of mile 92–135	733·82	734·16
	Base of G.T.R. rail, opposite B.M. DCLXXXV	738·13	738·47
677	On W. end of S. wall of culvert, 775 feet N. of mile 92–135	737·33	737·67
678	On W. end of S. wall of culvert, 775 feet N. of mile 92–135	737·33	737·67
	Base of G.T.R. rail at Rama station crossing	739·03	739·37
	Base of G.T.R. rail at Rama station	739·11	739·45
	Base of G.T.R. rail, first crossing N. of Rama station	723·41	723·75
DCLXXXVI.	On W. end of S. wall of culvert, 1,735 feet N. of mile 93–134.	719·96	720·30
	Base of G.T.R. rail, opposite B.M. DCLXXXVI	723·60	723·94
	Base of G.T.R. rail at Longford station	732·57	732·91
	Base of G.T.R. rail at Longford station crossing	734·50	734·84
DCLXXXVII.	On rock, 60 feet E. of tracks, opposite mile post 94–133.	729·65	729·99
	Base of G.T.R. rail, opposite B.M. DCLXXXVII	732·59	732·93
672	On W. end of wooden culvert, 450 feet N. of Orillia station	722·37	722·72
	Base of G.T.R. rail at Orillia station, branch to Midland	723·50	723·85
	Base of G.T.R rail at Elgin street crossing, Orillia	724·23	724·58
	Base of G.T.R. rail at Colborne street crossing, Orillia	725·39	725·74
	Base of G.T.R. rail at Mississaga street crossing, Orillia	724·85	725·20
DCLXXXVIII.	On N. end of front of Vick's flour mill, Tecumseh street	731·05	731·40
	Base of G.T.R. rail at Tecumseh St. crossing, Orillia	729·07	729·42
	Base of G.T.R. rail at Comice street, Orillia	732·90	733·25
	Base of G.T.R. rail at Jarvis street, Orillia	736·97	737·32
	Base of G.T.R. rail at Boland street, Orillia	740·30	740·65
	Base of G.T.R. rail at Cedar street, Orillia	744·50	744·86

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail at Ross street, Orillia	748·13	748·49
	Base of G.T.R. rail at road crossing, Orillia	744·04	744·40
	Base of G.T.R. rail at road crossing, Orillia	775·39	775·76
	Base of G.T.R. rail at Silver creek platform	745·38	745·75
	Base of G.T.R. rail at Silver creek, crossing	744·86	745·23
679	On W. end of N. wall of overhead crossing	733·36	733·73
	Centre of overhead crossing, 2,290 feet S. of mile 136·28	734·69	735·06
	Centre of bridge over Silver creek at mile post 136–28	720·26	720·63
680	On N.W. corner of N. abutment of bridge over Silver creek	678·76	679·14
	Centre of bridge over Silver creek	682·42	682·80
	Base of G.T.R., second crossing N. of Silver creek station	677·09	677·47
681	On rock, 7 feet N. of track, 421 feet S. of mile post 138–26	677·22	677·60
	Base of G.T.R. opposite B.M. 681	677·48	677·86
DCLXXXIX.	On rock, 7 feet N. of track, 2,105 feet N. of mile 138–26	686·96	687·35
	Base of G.T.R. rail at B.M. DCLXXXIX	687·44	687·83
	Base of G.T.R. rail at Uhthoff crossing	696·41	696·80
682	On rock, 12 feet S. of track, 1,665 feet N. of mile 139–25	695·43	695·82
	Base of G.T.R. rail at B.M. 682	697·71	698·10
	Base of G.T.R. rail at Uhthoff station	698·43	698·82
DCXC.	On rock, S. of track, 1,465 feet E. of mile 140–24	686·84	687·23
	Base of G.T.R. rail at B.M. DCXC	685·92	686·31
	Base of G.T.R. rail, first crossing N. of Uhthoff station	677·72	678·11
683	On N.W. corner of culvert, 660 feet N. of mile 141–23	643·95	644·35
	Base of G.T.R. rail at bench 683	645·01	645·41
DCXCI.	On rock, 11 feet S. of track, 1,850 feet S. of mile 142–22	659·21	659·61
	Base of G.T.R. rail, opposite B.M. DCXCI	658·18	658·58
	Base of G.T.R. rail at Foxmead station	677·80	678·20
	Base of G.T.R. rail at Foxmead station crossing	678·01	678·41
	Base of G.T.R. rail at Foxmead, second crossing	668·66	669·06
DCXCII.	On boulder, 23 feet N. of track, 1,985 feet W. of mile 142–22	659·85	660·25
	Base of G.T.R. rail at B.M. DCXCII	665·43	665·83
684	On boulder, 6 feet W. of track, 1,650 feet N. of mile 143–21	655·93	656·34
	Base of G.T.R. rail, opposite B.M. 684	655·50	655·91
	Base of G.T.R. rail at Tait station crossing	640·51	640·92
	Base of G.T.R. rail at Tait station	639·45	639·86
DCXCIII.	On rock, 9 feet N. of track, 1,925 feet E. of mile 145–19	632·93	633·35
	Base of G.T.R. rail, opposite B.M. DCXCIII	632·30	632·72
	Base of G.T.R. rail, first crossing W. of Tait station	621·08	621·50
	Base of G.T.R. rail, crossing of C.P.R., Sudbury line	619·35	619·77
	Base of G.T.R. rail, second crossing W. of Tait station	618·37	618·79
685	On boulder, 9 feet N. of track, 957 feet W. of mile 146–18	607·46	607·88
	Base of G.T.R. rail, opposite B.M. 685	608·71	609·13
	Base of G.T.R. rail, second crossing W. of Tait station	608·98	609·40
	Base of G.T.R. rail, first crossing E. of Coldwater station	589·29	589·72
	Base of G.T.R. rail, centre of bridge over Coldwater river	589·28	589·71
686	On N.E. corner of bridge over Coldwater river	586·44	586·87
	Base of G.T.R. rail at Coldwater station	588·03	588·46
	Base of G.T.R. rail, first crossing W. of Coldwater	595·61	596·04
	Base of G.T.R. rail, second crossing W. of Coldwater	596·95	597·39
	Base of G.T.R. rail, third crossing W. of Coldwater	596·51	596·95
	Base of G.T.R. rail at Fesserton crossing	588·40	588·84
	Base of G.T.R. rail at Fesserton station	588·50	588·94
687	On E. end of culvert, ⅓ mile west of Fesserton station	587·12	587·56
	Base of G.T.R. rail at B.M. 687	590·01	590·45
	Base of G.T.R. rail, at crossing to Carter's saw mill	587·88	588·32
688	On W. base of chimney of James Carter's saw mill	586·27	586·71
	Base of G.T.R. rail, main road crossing, Waubaushene	592·30	592·74
	Base of G.T.R. rail at Waubaushene station	592·69	593·13
DCXCIV.	On N.E. base of Waubaushene station	593·65	594·09
	Street level, intersection of main road and road to wharf	588·85	589·29
	Base of G.T.R. rail, French street crossing	594·45	594·90
	Base of G.T.R. rail, main road crossing	600·66	601·11
	Base of G.T.R. rail, Pine street crossing	592·62	593·07
DCXCV.	On W. face of boulder, 26 feet N. of track	587·45	587·90
	Base of G.T.R. rail, opposite B.M. DCXCV	589·89	590·34
	Base of G.T.R. rail at Tanner's crossing	594·25	594·71
	Base of G.T.R. rail at Tanner's station	593·82	594·28
	Base of G.T.R. rail at Sturgeons Bay station	589·91	590·37
	Base of G.T.R. rail, centre of bridge over Sturgeon river	591·79	592·26
	Base of G.T.R. rail under overhead crossing	611·56	612·04
	Base of G.T.R. rail at Helen street crossing	599·29	599·77
	Base of G.T.R. rail at John street crossing	596·19	596·68
DCXCVI.	On W. base of saw-dust consumer, Victoria Harbour	591·57	592·06
DCXCVII.	On N.E. corner of pumphouse, Victoria Harbour	589·24	589·73
	Base of G.T.R. rail at Victoria Harbour station	595·04	595·53
689	On E. end of W. abutment of bridge over Hog creek	590·99	591·49
DCXCVIII.	On W. end of W. abutment of bridge over Hog creek	587·13	587·63
	Centre of bridge over Hog creek	594·41	594·91
	Base of G.T.R. rail, first crossing W. of Victoria Harbour	595·20	595·70

SESSIONAL PAPER No. 19a

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, second crossing W. of Victoria Harbour..	597·41	597·91
	Base of G.T.R. rail, third crossing W. of Victoria Harbour...	593·10	593·61
	Base of G.T.R. rail, fourth crossing W. of Victoria Harbour..	593·68	594·19
	Base of G.T.R. rail, fifth crossing W. of Victoria Harbour....	624·26	624·78
690	On W. end of G.T.R. bridge over Mud Lake river.....	594·19	594·72
	Centre of G.T.R., bridge over Mud Lake river.....	596·71	597·24
	Base of G.T.R. rail at Old Fort station.....	598·18	598·71
	Base of G.T.R. rail at Midland station.....	593·23	593·79
DCXCIX.	On foundation of bay window, Wm. Rogers' house, Bay St..	601·19	601·75
DCC.	On Bay street, foundation of Queen's Hotel, Midland.....	597·94	598·50
	Base of G.T.R. rail, opposite B.M. DCLXXXVII.....	732·58	732·93
	Base of G.T.R., rail at crossing.....	758·50	758·83
	Base of G.T.R. rail, opposite B.M. DCCXXVII.....	758·48	758·81
DCCXXVII.	On rock, 7 feet W. of track, 95 feet S. of centre of crossing...	759·31	759·64
	Base of G.T.R. rail at crossing.....	757·62	757·95
	Base of G.T.R. rail, opposite B.M. 702.....	735·30	735·63
702	On rock, 10 feet W. of track, 372 feet N. of mile 131–96.....	734·67	735·00
	Base of G.T.R. rail, opposite B.M. DCCXXV.....	723·50	723·83
DCCXXVI.	On rock, 20 feet W. of track, 935 feet N. of mile 130–97.....	720·60	720·93
	Centre of G.T.R. bridge over E. branch of Severn river.....	727·83	728·16
DCCXXV.	On E. end of N. abutment of bridge over E. branch of Severn river.....	724·09	724·42
	Base of G.T.R. rail at crossing of James Bay Ry.....	725·23	725·56
	Centre of G.T.R. bridge over E. arm of W. branch of Severn river.....	727·65	727·97
DCCXXIV.	On E. end of N. abutment of bridge, E. arm of W. branch of Severn river.....	726·24	726·56
	Base of G.T.R. rail, at Washago station.....	727·23	727·55
	Base of G.T.R. rail, at Washago crossing.....	727·67	727·99
	Centre of G.T.R. bridge over W. branch of Severn river.....	730·84	731·16
DCCXXIII.	On W. end of N. abutment of bridge over W. branch of Severn river.....	729·15	729·47
	Base of G.T.R. rail, opposite B.M. 701.....	732·11	732·43
701	On rock, 13 ft. W. of track, 1,065 N. of mile 127–100.....	731·95	732·27
	Base of G.T.R. rail, at Severn station.....	727·78	728·10
	Base of G.T.R. rail, centre of bridge over Severn river.....	723·99	724·31
DCCXXII	On W. end of N. abutment of bridge over Severn river.....	718·55	718·87
	Base of G.T.R. rail, at crossing.....	732·60	732·92
	Base of G.T.R. rail, opposite B.M. 700.....	735·25	735·57
700	On rock, 14 ft. W. of track, 340 ft. N. of centre of crossing...	735·89	736·21
	Base of G.T.R. rail, at crossing.....	749·57	749·89
	Base of G.T.R. rail, at crossing.....	741·84	742·16
	Base of G.T.R. rail, opposite B.M. DCCXXI.....	730·76	731·08
DCCXXI.	On rock, 5 ft. of track, 2,390 ft. N. of mile 125–102.....	731·29	731·61
	Base of G.T.R. rail, at crossing.....	731·42	731·74
	Base of G.T.R. rail, at crossing.....	727·15	727·46
	Base of G.T.R. rail, opposite B.M. DCCXX.....	731·84	732·15
DCCXX.	On rock, 23 ft. W. of track, 2,190 ft. N. of mile 124–103.....	734·62	734·93
	Base of G.T.R. rail; at crossing.....	722·09	722·40
	Centre of G.T.R. bridge over Kashabogamog river.....	719·49	719·80
DCCXIX.	On W. end of N. abutment of bridge over Kashabogamog river.....	715·74	716·05
	Base of G.T.R. rail, opposite B.M. DCCXVIII.....	719·63	719·94
DCCXVIII.	On rock, 6 ft. W. of track, 1,188 ft. S. of mile 121–107	720·18	720·49
	Base of G.T.R. rail, opposite B.M. 699.....	730·40	730·71
699	On rock, 22 ft. E. of track, 328 ft. N. of mile 121–107.....	730·83	731·14
	Base of G.T.R. rail, at 1st crossing S. of Kilworthy station..	734·59	734·90
	Base of G.T.R. rail, at Kilworthy station.....	747·39	747·70
	Base of G.T.R. rail, at Kilworthy crossing.....	750·85	751·16
	Base of G.T.R. rail, opposite B.M. DCCXVII.....	743·01	743·31
DCCXVII.	On rock, 12 ft. E. of track, 715 ft. S. of mile 120–107.....	744·67	744·97
	Base of G.T.R. rail, at crossing.....	740·93	741·23
	Base of G.T.R. rail, opposite B.M. DCCXVI.....	755·74	756·04
DCCXVI.	On rock, 11 ft. W. of track, 465 ft. N. of mile 119–108.....	758·65	758·95
	Base of G.T.R. rail, opposite B.M. DCCXV.....	798·57	798·87
DCCXV.	On rock, 34 ft. W. of track, 1,140 ft. S. of mile 118–109.....	798·86	799·16
	Base of G.T.R. rail, opposite B.M. DCCXV.....	847·65	847·95
DCCXIV.	On rock, 37 ft. E. of track, 805 ft. S. of mile 117–110.....	848·70	849·00
	Base of G.T.R. rail, opposite B.M. DCCXIV.....	846·00	846·30
698	On rock, 7·7 ft. W. of track, 2,526 ft. N. of mile 117–110....	847·44	847·74
	Base of G.T.R. rail, opposite B.M. DCCXIII.....	837·05	837·34
DCCXIII.	On rock, 6·6 ft. E. of track, 69 ft. S. of mile 116–111.....	838·24	838·53
DCCXII.	On rock at Dyment's wharf, 225 ft. W. of Muskoka wharf....	746·03	746·32
	Base of G.T.R. rail, at Muskoka wharf station.....	743·75	744·05
	Base of G.T.R. rail, crossing, branch to Muskoka wharf.....	751·07	751·36
	Base of G.T.R. rail, opposite Gravenhurst station.....	815·06	815·35
	Base of G.T.R. rail, opposite B.M. DCCXI.....	818·62	818·91
DCCXI.	On rock, 36 ft. E. of track, 360 ft. N. of Gravenhurst station..	817·96	818·25
	Base of G.T.R. rail, at crossing of Muskoka road.....	828·96	829·25

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, at crossing of James street	832·11	832·40
	Base of G.T.R. rail, at crossing of Philip and Royal streets	836·18	836·47
	Base of G.T.R. rail, at crossing of Brock street	839·03	839·32
	Base of G.T.R. rail, at crossing of Church street	834·35	834·64
	Base of G.T.R. rail, at crossing	826·90	827·19
	Base of G.T.R. rail, opposite B.M. 697	827·11	827·40
697	On rock, 21 ft. W. of track, 495 ft. S. of mile 114–113	825·34	825·63
	Base of G.T.R. rail, over creek	812·27	812·56
	Base of G.T.R. rail, over road	812·31	812·60
	Base of G.T.R. rail, opposite B.M. DCCX	812·28	812·57
DCCX.	On W. end of N. abutment of overhead crossing at road and creek	810·74	811·03
	Base of G.T.R. rail, at crossing	826·11	826·40
	Base of G.T.R. rail, opposite B.M. 696	828·37	828·66
696	On rock, 17 ft. W. of track, 1,120 ft. N. of mile 113–114	827·98	828·27
	Base of G.T.R. rail, opposite B.M. DCCIX	849·95	850·24
DCCIX.	On rock, 8½ ft. E. of track, 1,980 ft. S. of mile 112–115	850·12	850·41
	Base of G.T.R. rail, at crossing	868·89	869·17
	Base of G.T.R. rail, opposite B.M. 695	884·07	884·35
695	On rock, 28 ft. W. of track, 260 ft. S. of mile 111–116	883·56	883·84
	Base of G.T.R. rail, at crossing	897·88	898·16
	Base of G.T.R. rail, opposite B.M. 694	903·93	904·21
694	On rock, 29 ft. W. of track, 2,035 ft. S. of mile 110–117	900·85	901·13
	Base of G.T.R. rail, opposite B.M. DCCVIII	901·29	901·57
DCCVIII.	On rock, 9 ft. W. of track, 2,060 ft. S. of post 109–118	903·26	903·54
	Base of G.T.R. rail, opposite B.M. DCCVII	895·82	896·10
DCCVII.	On boulder, 46 ft. E. of track, 1,515 ft S. of mile 108–119	894·82	895·10
	Base of G.T.R. rail, at crossing	879·99	880·26
	Base of G.T.R. rail, opposite B.M. 693	860·84	861·11
693	On rock, 23 ft. E. of track, 2,450 ft. N. of mile 108–119	864·00	864·27
	Base of G.T.R. rail, opposite B.M. DCCVI	801·85	802·12
DCCVI.	On E. end of S. abutment of bridge, S. branch Muskoka river	797·02	797·29
	Base of G.T.R. rail, centre of bridge, S. branch Muskoka river	801·89	802·16
	Base of G.T.R. rail, at main road crossing	813·75	814·02
	Base of G.T.R. rail, opposite B.M. DCCV	816·54	816·81
DCCV.	On W. face of S. abutment of G.T.R. bridge over Muskoka river	811·99	812·26
	Centre of G.T.R. bridge over Muskoka river	816·63	816·90
	Base of G.T.R. rail, at B.M. DCCIV	815·64	815·91
	Base of G.T.R. rail, at Manitoba street, Bracebridge	815·93	816·20
DCCIV.	On rock, 9·6 ft. E. of track, 40 ft. N. of centre of Manitoba street	817·56	817·83
	Centre of highway bridge over Muskoka river at Thomas street	811·34	811·61
692	On S. end of W. abutment of bridge at Thomas street	807·78	808·05
	Base of G.T.R. rail, opposite Thomas street crossing	810·61	810·88
	Base of G.T.R. rail, opposite Bracebridge station	812·26	812·53
	Base of G.T R. rail, 1st crossing N. of Bracebridge station	821·82	822·09
	Base of G.T.R. rail, opposite B.M. DCCIV	850·50	850·76
691	On rock 24 ft. W. of track, 414 ft. N. of mile post 104–123	851·14	851·40
	Base of G.T.R. rail, at B.M. DCCIII	885·73	885·99
DCCIII.	On E. face of culvert, 1,180 ft. S. of mile 103–124	870·09	870·35
	Base of G.T.R. rail, 4th crossing S. of Falkenburg station	919·03	919·29
	Base of G.T.R. rail, 3rd crossing S. of Falkenburg station	923·61	923·87
	Base of G.T.R. rail, 2nd crossing S. of Falkenburg station	934·37	934·63
	Base of G.T.R. rail, opposite B.M. DCCII	941·83	942·09
DCCII.	On rock, 10 ft. E. of track, 900 ft. N. of mile 101–126	941·67	941·93
	Base of G.T.R. rail, Falkenburg station crossing	952·02	952·32
	Base of G.T.R. rail, Falkenburg station	952·25	952·51
	Base of G.T.R. rail, opposite B.M. DCCI	954·09	954·35
DCCI.	On flat rock, 21 ft. W. of track, 213 ft. S. of mile 100–127	951·89	952·15
	Base of G.T.R. rail, opposite B.M. DCCI	954·08	954·35
DCCXXVIII.	On rock, 11 ft. E. of track, 2,390 ft. N. of mile 127–100	955·24	955·49
	Base of G.T.R. rail, opposite B.M. DCCXXVIII	954·79	955·04
	Base of G.T.R. rail, at crossing	970·35	970·60
DCCXXIX.	On W. face of culvert, 2,407 ft. N. of mile 128–99	983·59	983·84
	Base of G.T.R. rail, opposite B.M. DCCXXIX	988·18	988·43
	Base of G.T.R. rail, at crossing	1,008·13	1,008·38
DCCXXX.	On rock, 9 ft. W. of track, 61.9 ft. S. of mile 130–97	1,044·71	1,044·96
	Base of G.T.R. rail, opposite B.M. DCCXXX	1,043·23	1,043·48
	Base of G.T.R. rail, at crossing	1,009·30	1,009·55
	Base of G.T.R. rail, at crossing	1,021·94	1,022·18
DCCXXXI.	On rock, E. side of track, 1,700 ft. N. of mile post 131–96	1,024·70	1,024·94
	Base of G.T.R. rail, opposite B.M. DCCXXI	1,024·11	1,024·35
DCCXXXII.	On rock, 9 ft. W. of track, 1,230 ft. N. of mile 132–95	1,005·96	1,006·20
	Base of G.T.R. rail, opposite B.M. DCCXXXII	1,005·70	1,005·94
703	On W. face of culvert, 2,565 ft. S. of mile 133–94	986·64	986·88

SESSIONAL PAPER No. 19a

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, opposite B.M. 703	993·01	993·25
	Base of G.T.R. rail, at crossing	1,013·19	1,013·43
	Base of G.T.R. rail, at crossing	1,038·88	1,039·12
	Base of G.T.R. rail, at crossing	1,022·46	1,022·70
DCCXXXIII.	On rock, 35 ft. W. of track, 357 ft. S. of mile 135–92	1,027·95	1,028·19
	Base of G.T.R. rail, opposite B.M. DCCXXXIII	1,030·62	1,030·86
	Base of G.T.R. rail, at Utterson station	1,035·67	1,035·90
	Base of G.T.R. rail, at Utterson station crossing	1,036·06	1,036·29
DCCXXXIV.	On rock, 8·7 ft. E. of track, 140 ft. N. of Utterson crossing	1,037·57	1,037·80
	Base of G.T.R. rail, opposite B.M. DCCXXIV	1,035·73	1,035·96
DCCXXXV.	On rock, 9 ft. E. of track, 2,070 ft. N. of mile post 136–91	1,048·70	1,048·93
	Base of G.T.R. rail, opposite B.M. DCCXXXV	1,045·49	1,045·72
DCCXXXVI.	On rock, 7 ft. W. of track, 1,590 ft. N. of mile 137–90	1,002·31	1,002·54
	Base of G.T.R. rail, opposite B.M. DCCXXXVI	1,001·31	1,001·54
	Base of G.T.R. rail, at crossing	995·79	996·02
704	On boulder, 17 ft. W. of track, 134 ft. S. of mile 138–89	977·54	977·77
	Base of G.T.R. rail, opposite B.M. 704	976·84	977·07
	Base of G.T.R. rail, at crossing	974·18	974·41
	Base of G.T.R. rail, at crossing	969·39	969·62
	Base of G.T.R. rail, centre of bridge over creek	964·72	964·95
	Base of G.T.R. rail, at crossing	964·67	964·90
705	Under E. rail, N. end of bridge over creek	964·05	964·27
	Centre of G.T.R., wooden bridge over creek	967·00	967·22
DCCXXXVII.	On S. end of W. face of culvert, 780 ft. S. of mile 140–87	967·08	967·30
	Base of G.T.R. rail, opposite B.M. DCCXXXVII	974·78	975·00
	Base of G.T.R. rail, at crossing	986·44	986·66
	Base of G.T.R. rail, at crossing	1,017·21	1,017·43
DCCXXXVIII.	On rock, 40 ft. E. of track, 173 ft. S. of mile 142–85	1,025·04	1,025·26
	Base of G.T.R. rail, opposite B.M. DCCXXXVIII	1,028·55	1,028·77
	On base of G.T.R. rail, at crossing	1,002·53	1,002·75
706	On boulder, 48 ft. E. of track, 1,360 ft. N. of mile 143–84	976·74	976·95
	Base of G.T.R. rail, opposite B.M. 706	979·36	979·57
	Base of G.T.R. rail, at crossing	975·05	975·26
707	On boulder, 9 ft. E. of track, 575 ft. S. of mile 144–83	979·40	979·61
	Base of G.T.R. rail, opposite B.M. 707	979·11	979·32
	Base of G.T.R. rail, at crossing	945·86	946·07
	Base of G.T.R. rail, at main road crossing	946·08	946·29
DCCXXXIX.	On rock, 17 ft. E. of track, 1,725 ft. S. of mile 146–81	951·82	952·03
	Base of G.T.R. rail, opposite B.M. DCCXXXIX	950·47	950·68
	Base of G.T.R. rail, at crossing, Huntsville	954·06	954·27
	Base of G.T.R. rail at station, Huntsville	951·23	951·44
DCCXL.	On W. face of S. abutment of bridge over Vernon river	964·71	964·92
	Centre of G.T.R. bridge over Vernon river	965·57	965·78
	Base of G.T.R. rail, under centre of overhead crossing	969·37	969·58
	Base of G.T.R. rail at crossing	981·89	982·09
DCCXLI.	On rock, 10 feet W. of track at mile 148–79	996·10	996·30
	Base of G.T.R. rail, opposite B.M. DCCLI	994·75	994·95
	Base of G.T.R. rail at crossing	949·18	949·38
	Base of G.T.R. rail at crossing	947·16	947·36
DCCXLII.	On E. end of S. abutment of bridge over Big East river	954·10	954·30
	Centre of G.T.R. bridge over Big East river	957·08	957·28
DCCXLIII.	On W. end of S. wall of culvert, marked (206)	990·92	991·11
	Base of G.T.R. rail, opposite B.M. DCCXLIII	996·81	997·00
	Base of G.T.R. rail at crossing	997·52	997·71
	Base of G.T.R. rail at crossing	1,045·24	1,045·43
DCCXLIV.	On E. face of S. abutment of trestle over Little East river	1,041·35	1,041·54
	Centre of trestle over Little East river	1,044·39	1,044·58
	Base of G.T.R. rail at crossing	1,052·00	1,052·18
708	On centre of N. wall of cattle guard, N. side of crossing	1,051·62	1,051·81
	Base of G.T.R. rail at B.M. 708	1,052·00	1,052·19
	Base of G.T.R. rail at Novar crossing	1,070·72	1,070·90
	Base of G.T.R. rail at Novar station	1,070·37	1,070·55
709	On W. end of N. wall of culvert, 195 feet S. of mile 156–71	1,065·86	1,066·05
	Base of G.T.R. rail, opposite B.M. 709	1,069·51	1,069·69
710	On E. end of N. wall of culvert, 1,335 feet S. of mile 157–70	1,069·35	1,069·53
	Base of G.T.R. rail, opposite B.M. 710	1,072·40	1,072·58
711	On E. end of S. wall of culvert, 433 feet N. of mile 158–69	1,073·90	1,074·08
	Base of G.T.R. rail, opposite B.M. 711	1,076·74	1,076·92
DCCXLV.	On rock, 9 feet E. of track, 2,065 feet N. of mile 159–68	1,119·54	1,119·71
	Base of G.T.R. rail, opposite B.M. DCCXLV	1,119·56	1,119·73
	Base of G.T.R. rail under centre of overhead crossing	1,122·84	1,123·01
DCCXLVI.	On rock, 10 feet E. of track, 117 feet N. of overhead crossing.	1,122·38	1,122·55
	Base of G.T.R. rail, opposite B.M. DCCXLVI	1,120·84	1,121·01
DCCXLVII.	On rock, 14 feet E. of track, 160 feet N. of black-white semaphore, Scotia Junction	1,087·40	1,087·57
	Base of G.T.R. rail, opposite B.M. DCCXLVII	1,084·05	1,084·22
	Base of G.T.R. rail, Scotia junction	1,081·76	1,081·93
	Base of G.T.R. rail at crossing	1,082·83	1,083·00
	Base of G.T.R. rail opposite B.M. DCCLXXI	1,082·42	1,082·59

TORONTO to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
DCCLXXI.	On rock, 7 feet E. of track, 155 feet N. of semaphore	1,082·82	1,082·99
	Base of G.T.R. rail, centre of bridge over Ragged creek	1,069·71	1,069·88
	Base of G.T.R. rail at Elmsdale crossing	1,039·24	1,039·41
DCCLXX.	On rock, 70 feet W. of track, 23 feet S. of Elmsdale station	1,039·88	1,040·05
	Base of G.T.R. rail, at Elmsdale station	1,038·47	1,038·64
DCCLXIX.	On W. end of S. wall of culvert, 1,305 feet N. of mile 63–164.	1,025·42	1,025·58
	Centre of G.T.R. culvert over brook	1,031·53	1,031·69
	Base of G.T.R. rail at crossing	1,034·48	1,034·64
	Base of G.T.R. rail opposite B.M. DCCLXVIII	1,024·40	1,024·56
DCCLXVIII.	On rock, 8 feet W. of track, 1,150 feet S. of mile 62–165	1,023·62	1,023·78
	Centre of G.T.R. bridge over S. branch of Magnetawan river	983·73	983·89
DCCLXVII.	On E. face of N. abutment of bridge over Magnetawan river	981·23	981·39
	Base of G.T.R. rail at Katrine station crossing	983·53	983·69
	Base of G.T.R. rail at Katrine station	983·45	983·61
	Base of G.T.R. rail opposite B.M. DCCLXVI	982·79	982·94
DCCLXVI.	On rock, 9 feet E. of track, 490 feet S. of mile 59–168	983·85	984·00
	Centre of G.T.R. bridge over S. branch of Magnetawan river	976·97	977·12
DCCLXV.	On W. face of N. abutment of bridge over Magnetawan river	975·68	975·83
	Base of G.T.R. rail at crossing	983·89	984·04
	Centre of G.T.R. bridge over S. branch of Magnetawan river	969·96	970·11
DCCLXIII.	On E. face of N. abutment of bridge over S. branch of Magnetawan river	966·63	966·78
	Base of G.T.R. rail at crossing	975·41	975·55
	Base of G.T.R. rail at Burk's Falls station	970·57	970·71
	Base of G.T.R. rail at Magnetawan wharf station	939·66	939·80
	Level of S.E. corner of Magnetawan river wharf	932·06	932·20
718	On rock, 34 feet S. of track, 39 feet off Magnetawan river wharf.	933·52	933·66
	Centre of G.T.R. bridge over Burk's Falls	953·97	954·11
	Base of G.T.R. rail, opposite B.M. DCCLXIV	956·01	956·15
DCCLXIV.	On rock, 7½ feet W. of track, to sawmills, Burk's Falls	958·80	958·94
	Crest of dam, head of Burk's Falls	956·33	956·47
	Centre of highway bridge, foot of main street, Burk's Falls	962·97	963·11
	Base of G.T.R. rail, foot of main street, Burk's Falls	964·00	964·14
	Centre of G.T.R. bridge, over S. branch of Magnetawan river	969·89	970·03
	Centre of G.T.R. bridge, over N. branch of Magnetawan river.	982·97	983·10
DCCLXII.	On W. face of N. abutment of bridge, over N. branch of Magnetawan river	978·57	978·71
	Base of G.T.R. rail at crossing	1,009·97	1,010·11
	Base of G.T.R. rail, opposite B.M. DCCLXI	1,021·29	1,021·43
DCCLXI.	On rock, 9 feet W. of track, 237 feet N. of mile 54–173	1,023·82	1,023·96
	Base of G.T.R. rail, opposite B.M. DCCLX	1,064·37	1,064·51
DCCLX.	On rock, 10 feet W. of track, 360 feet S. of mile 53–174	1,064·31	1,064·45
	Base of G.T.R. rail, opposite B.M. DCCLIX	1,056·47	1,056·61
DCCLIX.	On S. end of E. face of culvert, 2,326 feet N. of mile 53–174	1,041·89	1,042·03
	Base of G.T.R. rail at Berrydale crossing	1,058·26	1,058·40
	Base of G.T.R. rail opposite B.M. DCCLVIII	1,133·10	1,133·23
DCCLVIII.	On rock, 11½ feet W. of track, 58½ feet S. of mile 51–176	1,132·84	1,132·97
	Base of G.T.R. rail at crossing	1,135·27	1,135·40
	Base of G.T.R. rail opposite B.M DCCLVII	1,108·38	1,108·51
DCCLVII.	On boulder, 29 feet W. of track, 288 feet N. of mile 50–177	1,102·10	1,102·23
	Base of G.T.R. rail at crossing	1,091·32	1,091·45
	Base of G.T.R. rail opposite B.M. 717	1,089·72	1,089·85
717	On boulder, 25 feet W. of track, 105 feet S. of mile 49–178	1,090·36	1,090·49
	Base of G.T.R. rail opposite B.M. DCCLVI	1,103·11	1,103·24
DCCLVI.	On rock, 7½ feet W. of track, 1,106 feet S. of mile 48–179	1,102·19	1,102·32
	Centre of G.T.R. wooden bridge over Stony creek	1,090·05	1,090·18
716	On E. side of S. end of wooden bridge over Stony creek	1,087·20	1,087·33
	Base of G.T.R. rail, opposite B.M. 715	1,110·53	1,110·65
715	On rock, 6 feet E. of track, 188 feet N. of mile 47–180	1,109·66	1,109·78
	Base of G.T.R. rail at crossing	1,100·40	1,100·52
	Base of G.T.R. rail opposite B.M. DCCLV	1,096·05	1,096·17
DCCLV.	On rock, 18 feet W. of track, 435 feet N. of mile 46–181	1,094·57	1,094·69
	Base of G.T.R. rail opposite B.M. 714	1,095·54	1,095·66
714	On W. end of N. wall of culvert, 345 feet N. of mile 45–182	1,090·47	1,090·59
	Base of G.T.R. rail at road crossing	1,094·25	1,094·37
	Base of G.T.R. rail at crossing of street	1,098·88	1,099·00
	Base of G.T.R. rail opposite B.M. 713	1,099·13	1,099·25
713	On W. end of N. wall of cattle guard, 250 feet S. of mile 44–183.	1,095·52	1,095·64
	Base of G.T.R. rail at crossing of street	1,098·93	1,099·05
	Base of G.T.R. rail at Sundridge station crossing	1,099·66	1,099·77
	Base of G.T.R. rail at Sundridge station	1,099·88	1,099·99
	Base of G.T.R. rail at crossing	1,109·61	1,109·72
	Base of G.T.R. rail opposite B.M. DCCLIV	1,118·98	1,119·09
DCCLIV.	On S. end of W. face of culvert, 356 feet S. of mile 43–184.	1,114·04	1,114·15
	Base of G.T.R. rail at crossing	1,119·43	1,119·54
	Base of G.T.R. rail at crossing	1,128·12	1,128·23
	Base of G.T.R. rail opposite B.M. DCCLIII	1,146·89	1,147·00
DCCLIII.	On rock, 11 feet W. of track, 215 feet S. of mile 42–185	1,147·94	1,148·05
	Base of G.T.R. rail opposite B.M. DCCLII	1,160·18	1,160·29

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
DCCLII.	On boulder, 41 feet W. of track, 2,380 feet S. of mile 41–186.	1,158·86	1,158·97
	Base of G.T.R. rail at crossing	1,186·31	1,186·42
	Base of G.T.R. rail at crossing	1,173·18	1,173·29
	Base of G.T.R. rail opposite B.M. 712	1,155·20	1,155·30
712	On boulder, 14 feet E. of track, 400 feet S. of semaphore	1,158·19	1,158·29
	Base of G.T.R. rail at South River station	1,157·07	1,157·17
	Base of G.T.R. rail at South River station crossing	1,157·87	1,157·97
	Base of G.T.R. rail opposite B.M. DCCLI	1,157·78	1,157·88
DCCLI.	On rock, 8 feet W. of track, 189 feet N. of semaphore	1,156·33	1,156·43
	Centre of G.T.R. bridge over South river	1,156·75	1,156·85
DCCL.	On E. end of N. abutment of bridge over South river	1,156·88	1,156·98
	Base of G.T.R. rail opposite B.M. DCCXLIX	1,152·95	1,153·05
DCCXLIX.	On rock, 11 feet W. of track, 518 feet N. of mile 37–190	1,152·57	1,152·67
	Base of G.T.R. rail opposite B.M. DCCXLVIII	1,152·75	1,152·85
DCCXLVIII.	On rock, 11 feet E. of track, 51 feet S. of mile 36·191	1,184·07	1,184·17
	Base of G.T.R. rail opposite B.M. DCCXLVIII	1,185·11	1,185·21
	Base of G.T.R. rail at crossing	1,184·08	1,184·17
DCCLXXII.	On rock, 9 feet E. of track, 158 feet S. of mile 35–192	1,195·16	1,195·26
	Base of G.T.R. rail opposite B.M. DCCLXXII	1,194·77	1,194·86
719	On boulder, 16 feet W. of track, 62 feet N. of mile 34–193	1,195·27	1,195·36
	Base of track, opposite B.M. 719	1,194·83	1,194·92
DCCLXXIII.	On rock, 16 feet W. of track, 2,080 feet S. of mile 33–194	1,194·10	1,194·19
	Base of G.T.R. rail opposite B.M. DCCLXXIII	1,192·34	1,192·43
	Base of G.T.R. rail at gravel pit crossing	1,193·84	1,193·93
	Base of G.T.R. rail, centre of high trestle over gully	1,190·05	1,190·14
DCCLXXIV.	On rock, 10 feet W. of track, at mile post 33–194	1,175·69	1,175·78
	Base of G.T.R. rail opposite B.M. DCCLXXIV	1,176·97	1,177·06
DCCLXXV.	On rock, 10 feet E. of track, 174 feet S. of mile post 32–195	1,174·65	1,174·74
	Base of G.T.R. rail opposite B.M. DCCLXXV	1,150·32	1,150·41
DCCLXXVI.	On boulder, 12 feet W. of track, 305 feet S. of mile 31–196	1,148·17	1,148·26
	Base of G.T.R. rail opposite B.M. DCCLXXVI	1,105·61	1,105·69
720	On boulder, 16 feet E. of track at mile post 30–197	1,104·24	1,104·32
	Base of G.T.R. rail opposite B.M. 720	1,053·76	1,053·84
721	On W. end of N. abutment of bridge, 480 feet S. of mile 29–198	1,054·88	1,054·96
	Base of G.T.R. rail, centre of bridge, 480 feet S. of mile 29–198	1,030·93	1,031·01
722	On boulder, 14½ feet W. of track, 106 feet S. of mile 28–197	1,033·19	1,033·27
	Base of G.T.R. rail opposite B.M. 722	1,025·87	1,025·95
	Base of G.T.R. rail, centre of bridge over South river	1,029·23	1,029·31
723	On S. base support of G.T.R. tank, Trout creek	1,026·05	1,026·12
	Base of G.T.R. rail opposite B.M. 723	1,027·30	1,027·37
	Base of G.T.R. rail at Trout creek station	1,026·35	1,026·42
	Base of G.T.R. rail at Trout creek station crossing	1,026·80	1,026·87
DCCLXXVII.	On boulder, 13 feet W. of track, 240 feet N. of mile 25–202	1,027·38	1,027·45
	Base of G.T.R. rail opposite B.M. DCCLXXVII	1,039·36	1,039·43
DCCLXXVIII.	On rock, 7½ feet E. of track, 475 feet N. of mile post 24–203	1,039·24	1,039·31
	Base of G.T.R. rail opposite B.M. DCCLXXVIII	1,024·39	1,024·45
	Base of G.T.R. rail at crossing	1,024·72	1,024·78
DCCLXXIX.	On rock, 8 feet E. of track, 884 feet N. of mile 23–204	977·71	977·77
	Base of G.T.R. rail opposite B.M. DCCLXXIX	974·62	974·68
DCCLXXX.	On rock, 5½ feet E. of track, 615 feet S. of mile 22–205	974·13	974·19
	Base of G.T.R. rail opposite B.M. DCCLXXX	934·57	934·63
724	On boulder, 7½ feet E. of track, at mile 22–205	934·72	934·78
	Base of G.T.R. rail opposite B.M. 724	928·21	928·27
	Base of G.T.R. rail at crossing	928·60	928·66
	Base of G.T.R. rail, centre of bridge over brook	908·71	908·77
	Base of G.T.R. rail at crossing	881·34	881·40
	Base of G.T.R. rail at Powassan station	885·66	885·72
	Base of G.T.R. rail, overhead crossing of street	855·41	855·47
	Base of G.T.R. rail, overhead crossing of McGuiness' brook	856·07	856·12
DCCLXXXI.	On E. face of N. abutment of bridge over McGuiness' brook	856·10	856·15
	Base of G.T.R. rail at crossing	852·21	852·26
725	On boulder, 25 feet E. of track, 1,110 feet S. of mile 18–209	858·88	858·93
	Base of G.T.R. rail opposite B.M. 725	872·38	872·43
	Centre of G.T.R. trestle over brook	873·41	873·46
	Base of G.T.R. rail at crossing	867·32	867·37
726	On boulder, 7½ feet W. of track, 480 feet S. of mile 17–210	870·36	870·41
	Base of G.T.R. rail opposite B.M. 726	864·49	864·54
DCCLXXXII.	On boulder, 30 feet E. of track, 58 feet S. of mile post 16–211	865·46	865·51
	Base of G.T.R. rail opposite B.M. DCCLXXXII	868·11	868·16
727	On boulder, 8½ feet W. of track, 340 feet S. of mile 15–217	869·57	869·62
	Base of G.T.R. rail opposite B.M. 727	875·91	875·95
	Centre of G.T.R. trestle over brook	877·57	877·61
DCCLXXXIII.	On rock, 10 feet W. of track, 2,515 feet S. of mile 14–213	879·46	879·50
	Base of G.T.R. rail opposite B.M. DCCLXXXIII	888·83	888·87
DCCLXXXIV.	On rock, 34 feet W. of main track, 68 feet S. of mile 14–213	887·91	887·95
	Base of G.T.R. rail opposite B.M. DCCLXXXIV	883·24	883·28
DCCLXXXV.	On rock, 8 feet E. of track, 365 feet S. of mile 13–214	884·91	884·95
	Base of G.T.R. rail opposite B.M. DCCLXXXV	873·79	873·83
		872·47	872·51

Toronto to North Bay, &c.—Complete List of Bench Marks, &c.—*Concluded.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
DCCLXXXVI.	On rock, 7 feet W. of track, 610 feet S. of mile 12–215	829·33	829·37
	Base of G.T.R. rail opposite B.M. DCCLXXXVI	828·12	828·16
	Centre of G.T.R. trestle over brook	804·31	804·34
DCCLXXXVII.	On rock, 13 feet E. of track. 39 feet S. of mile 11–216	768·12	768·15
	Base of G.T.R. rail, opposite B.M. DCCLXXXVII	769·89	769·92
	Base of G.T.R. rail, centre of trestle over brook	756·26	756·29
DCCLXXXVIII.	On E. face of S. abutment of bridge over Wistawasing river	739·51	739·54
	Center of G.T.R. bridge over Wistawasing river	743·53	743·56
	Base of G.T.R. rail, at crossing of Nipissing Nasbonsing Railway	742·63	742·66
DCCLXXXIX.	On rock, 9 ft. E. of track, 1,560 ft. S. of mile 9–218	757·83	757·86
	Base of G.T.R. rail, opposite B.M. DCCLXXXIX	757·42	757·45
	Centre of G.T.R. trestle over brook	727·57	727·60
	Base of G.T.R. rail at crossing	725·55	725·58
DCCXC.	On rock, 8½ ft. W. of track, 2,000 ft. S. of mile 8–219	712·83	712·86
	Base of G.T.R. rail, opposite B.M. DCCXC	710·70	710·73
DCCXCI.	On rock, 9 ft. W. of track, 129 ft. N. of S. semaphore	675·88	675·90
	Base of G.T.R. rail, opposlte B.M. DCCXCI	675·59	675·61
	Base of G.T.R. rail, overhead crossing of road	671·75	671·77
	Base of G.T.R. rail, overhead crossing of brook	671·56	671·58
	Base of G.T.R. rail, at Callender crossing	670·59	670·61
	Base of G.T.R. rail, at Callender station	670·21	670·23
DCCXCII.	On rock, 8½ ft. W. of track, 19 ft. S. of mile post 7–220	672·41	672·43
	Base of G.T.R. rail, opposite B.M. DCCXCII	672·93	672·95
	Base of G.T.R. rail, at crossing	684·62	684·64
728	On rock, 17½ ft. W. of track, 650 ft. N. of mile 6–221	705·59	705·61
	Base of G.T.R. rail, opposite B.M. 728	705·92	705·94
DCCXCIII	On rock, 9½ ft. W. of track, 1,060 ft. S. of mile 5–222	679·26	679·28
	Base of G.T.R. rail, opposite B.M. DCCXCIII	678·37	678·39
	Base of G.T.R. rail, centre of trestle over brook	671·47	671·49
	Base of G.T.R. rail, at crossing	674·76	674·78
DCCXCIV.	On E. face of S. abutment of bridge over Riviere à la Vase.	673·16	673·17
	Centre of bridge (G.T.R.) over Rivier- à la Vase	674·94	674·95
	Base of G.T.R. rail, at Nipissing station crossing	675·40	675·41
	Base of G.T.R. rail, at Nipissing station	675·38	675·39
	Base of G.T.R. rail, at junction with C.P.R. Nipissing	676·24	676·25
DCCXCV.	On rock, 10 ft. W. of track, at junction of G.T.R. with C.P.R.	677·50	677·51
	Base of G.T.R. rail, opposite B.M. DCCXCV	676·62	676·63
	C.P.R. bench, W. of track marked (653·77)	678·60	678·61
	Base of C.P.R. rail, at crossing	673·63	673·64
	Base of C.P.R. rail, junction to Callender	673·30	673·31
DXLVI.	On rock, 13 ft. N. of track, 717 ft. W. of mile 114 from Chalk River	667·43	667·44
	Base of G.T.R. rail, opposite B.M. DXLVI	665·31	665·32
	C.P.R. bench, marked (642·69)	667·65	667·62
611	On rock, 14 ft. S. of track, 95 ft. E. of mile 115	654·92	654·93
	Base of G.T.R. rail, opposite B.M. 611	654·50	654·51
	C.P.R. bench, marked (630·87)	655·75	655·74
DXLV.	On rock, 9 ft. N. of track, 280 ft. E. of mile 116	652·99	652·99
	Base of G.T.R. rail, opposite B.M., DXLC	650·81	650·81
	C.P.R. bench, marked (625·65)	650·55	650·55
	Centre of C.P.R. culvert, 116·19 miles from Chalk River	651·86	651·86
	Base of C.P.R. rail, at crossing	652·36	652·36
	Base of C.P.R. rail, junction of T.N.O. Ry	653·55	653·55
I.	Inside edge coping, 4th altar step, W. end of S. abutment of bridge	646·06	646·06
DXLIV.	On W. end of S. abutment of bridge over Chippewa creek	650·71	650·71
	Centre of C.P.R. bridge over Chippewa creek	654·03	654·03
	Base of C.P.R. rail, at crossing	653·94	653·94
DCCXCVI.	On base, E. face of C.P.R. North Bay	663·19	663·19
	Base of C.P.R. rail, opposite North Bay station	661·78	661·78

ROUSES' POINT TO MONTREAL, VIA LACOLLE JUNCTION, HOWICK JUNCTION, VALLEYFIELD, COTEAU JUNCTION AND LACHINE.

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
M—B	20·6 ft. from N.E. corner of Chapman building, Rouses' Point, N.Y.	107·96	107·96
	Base of D. & H. Railway at Chapman street crossing, Rouses' Point N.Y.	129·25	129·25
	Base of D. & H. Railway at Pratt street crossing, Rouses' Point, N.Y.	123·15	123·15
	Base of D. & H. Railway at Rouses' Point station	122·48	122·48
DCI.	+On N.E. corner of Rouses' Point station	123·76	123·76
	Base of D. & H. Railway at crossing of Rutland Railway	120·31	120·31
639	On boulder at boundary line, U.S. and Canada	113·40	113·41
	Base of rail at boundary line, U.S. and Canada	116·37	116·39
	Top of bronze cap Bench Well A in boundary, near River	93·60	93·63
	Cavity in bronze cap Bench Well A in boundary, near River	93·56	93·59
	Top of inside tube, Bench Well A in boundary, near River	101·57	101·59
	Top of outside tube, Bench Well A in boundary, near River	102·70	102·72
DCII.	On W. face of S. wall of G.T.R. culvert, 730 ft. S. of mile 46½	109·29	109·31
	Base of rail, centre of G.T.R. culvert, 730 ft. S. of mile 46½	113·57	113·59
	Base of rail, crossing 580 ft. S. of mile 45½	117·33	117·35
737	+On E. end of S. wall culvert, 210 ft. N. of semaphore	122·26	122·29
	Base of G.T.R. rail, opposite B.M. 737	126·71	126·74
	Base of G.T.R. rail, at Lacolle station	130·42	130·45
	Base of G.T.R. rail, at crossing	130·77	130·80
	Base of G.T.R. rail, at crossing of Napierville Railway	141·50	141·54
738	+On S. base stone of G.T.R. tank, Lacolle village	152·11	152·15
	Base of rail, opposite Lacolle village station	153·86	153·90
	Base of G.T.R. rail, Lacolle village station crossing	154·82	154·86
DCCCXIX.	On S.E. corner of A. Wilson's house back of G.T.R. station	156·72	156·76
	Base of G.T.R. rail, at road crossing	166·17	166·22
DCCCXX.	On E. end of N. face of culvert, N. side of G.T.R.	161·84	161·89
	Base of G.T.R. rail, opposite B.M. DCCCXX	166·26	166·31
DCCCXXI.	On N. end of W. abutment of G.T.R. bridge, Lacolle river	163·80	163·85
	Base of G.T.R. rail, centre of G.T.R. bridge, Lacolle river	166·95	167·00
	Base of G.T.R. rail, crossing	178·29	178·34
DCCCXXII.	On S. gable of priest's house, Ste. Claude de Lacolle	193·00	193·05
DCCCXXIII.	On N. side of Ste. Claude R.C. Church	192·81	192·86
DCCCXXIV.	On E. end of S. face of culvert, 125 ft. E. of mile 14	182·59	182·65
	Base of G.T.R. rail, opposite B.M. DCCCXXIV	185·14	185·20
	Base of G.T.R. rail, opposite Henrysburgh station	204·36	204·42
	Base of G.T.R. rail, opposite Henrysburgh station crossing	204·71	204·77
DCCCXXV.	On E. end of S. face of culvert, 2,262 ft. W. of mile 15	187·75	187·82
	Base of G.T.R. rail, opposite B.M. DCCCXXV	191·16	191·23
739	+On N. end of culvert, 340 ft. E. of mile 16	193·94	194·01
	Base of G.T.R. rail, opposite B.M. 739	195·19	195·26
DCCCXXVI.	On E. end of S. face of culvert, 1,620 ft. W. of mile 16	192·20	192·27
	Base of G.T.R. rail, opposite B.M. DCCCXXVI	196·99	197·06
	Base of G.T.R. rail, at road crossing	203·31	203·38
	Base of G.T.R. rail, at road crossing	217·98	218·05
DCCCXXVII.	On W. end of N. face of culvert, 480 ft. W. of mile 17	223·53	223·61
	Base of G.T.R. rail, opposite B.M. DCCCXXVII	226·51	226·59
DCCCXXVIII.	On S. end face, W. wall of culvert, 1,370 ft. W. of mile 18	207·50	207·58
	Base of G.T.R. rail, opposite B.M. DCCCXXVIII	210·65	210·73
	Base of G.T.R. rail, crossing 1,380 ft. W. of mile 18	210·58	210·66
DCCCXXIX.	On E. end of S. face of culvert, 1,620 ft. W. of mile 19	181·60	181·69
	Base of G.T.R. rail, opposite B.M. DCCCXXIX	184·10	184·19
	Base of G.T.R. rail, centre of bridge over Chambly river	182·84	182·93
DCCCXXX.	On boulder 29.7 ft. N. of track, 2,228 ft. W. of mile 20	182·42	182·52
	Base of G.T.R. rail, opposite B.M. DCCCXXX	184·52	184·62
	Base of G.T.R. rail, crossing	185·83	185·93
	Base of G.T.R. rail, opposite Johnson station	192·04	192·14
	Base of G.T.R. rail, opposite Johnson station crossing	193·04	193·14
	Base of G.T.R. rail, at Hemmingford junction	189·20	189·30
DCCCXXXI.	On W. end of small culvert, 2,120 ft. E. of mile 22	183·22	183·32
	Base of G.T.R. rail, opposite B.M. DCCCXXXI	185·50	185·60
DCCCXXXII.	On S. end of culvert, 162 ft. W. of mile 22	179·84	179·95
	Base of G.T.R. rail, opposite B.M. DCCCXXXII	182·04	182·15
	Base of G.T.R. rail, crossing	189·08	189·19
	Base of G.T.R. rail, centre of bridge over Norton brook	178·87	178·98
740	+On boulder, 22 ft. N. of track, 600 ft. E. of mile 23	177·67	177·78
	Base of G.T.R. rail, opposite B.M. 740	179·43	179·54
	Base of G.T.R. rail, centre of bridge over Cranberry brook	178·77	178·89
741	On boulder, 26 ft. S. of track and 1,745 ft. W. of mile 24	177·07	177·19
	Base of G.T.R. rail, opposite B.M. 741	179·07	179·19
DCCCXXXIII.	On rock 8.15 ft. S. of track, 1,634 ft. E. of mile 25	184·43	184·55

ROUSES' Point to Montreal, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, opposite B.M. DCCCXXXIII	184·78	184·90
	Base of G.T.R. rail, opposite Holton station	195·85	195·98
	Base of G.T.R. rail, opposite Holton station crossing	196·13	196·26
DCCCXXXIV.	On rock 9 ft. S. of track and 81 ft. W. of mile 26	195·08	195·21
	Base of G.T.R. rail, opposite B.M. DCCCXXXIV	196·13	196·26
DCCCXXXV.	On rock 8·65 ft. of track and 1,530 ft. W. of mile 27	204·11	204·25
	Base of G.T.R. rail, opposite B.M. DCCCXXXV	203·93	204·07
DCCCXXXVI.	On rock 7·65 ft. S. of track, and 2,330 ft. W. of mile 28	182·26	182·40
	Base of G.T.R. rail, opposite B.M. DCCCXXXVI	182·55	182·69
	Base of G.T.R. rail, at crossing	183·56	183·70
	Base of G.T.R. rail at crossing	179·31	179·46
DCCCXXXVII.	On E. end of N. face of culvert, 590 ft. W. of mile 30	151·15	151·30
	Base of G.T.R. rail, opposite B.M. DCCCXXXVII	155·12	155·27
	Base of G.T.R. rail, at crossing	142·08	142·24
DCCCXXXVIII.	On S. face of E. abutment of bridge over Norton brook	138·00	138·16
	Base of G.T.R. rail, opposite centre of bridge over Norton brook	141·45	141·61
	Base of G.T.R. rail, opposite Aubrey station	141·66	141·82
	Base of G.T.R. rail, opposite Aubrey station crossing	141·68	141·84
742	+On coping, N. end of culvert, 2,080 ft. E. of mile 33	136·46	136·63
	Base of rail, opposite B.M. 742	141·87	142·04
	Base of rail at crossing	141·77	141·94
DCCCXVIII.	On W. end of S. face of culvert, 2,570 ft. W. of mile 34	137·63	137·80
	Base of G.T.R. rail, opposite B.M. DCCCXVIII	140·80	140·97
	Base of G.T.R. rail, opposite B.M. DCCCXVII	142·98	143·16
DCCCXVII.	On rock 7·5 ft. N. of track and 560 ft. E. of mile 34	142·70	142·88
	Base of G.T.R. rail, crossing	141·50	141·69
	Base of G.T.R., rail crossing	131·49	131·68
	Base of G.T.R. rail, opposite B.M. DCCCXVI	130·89	131·08
DCCCXVI.	On S. face, W. abutment, bridge over English river	125·55	125·74
736	On S. seat, W. abutment, bridge over English river	128·80	128·99
	Base of G.T.R. rail, crossing	129·86	130·05
	Base of G.T.R. rail, crossing	129·60	129·79
	Base of G.T.R. rail, at Howick Junction	132·54	132·73
	Base of G.T.R. rail, opposite B.M. DCCCXV	132·28	132·48
DCCCXV.	On S. face of culvert, 245 ft. W. of mile 37	129·26	129·46
	Base of G.T.R. rail, crossing	131·45	131·65
735	+On N.E. corner of W. abutment, bridge over Chateauguay river	129·47	129·67
	Base of rail, centre of bridge over Chateauguay river	132·23	132·43
DCCCXIV.	On W. face of W. abutment, bridge over Chateauguay river	129·25	129·45
	Base of G.T.R. rail, crossing	131·45	131·65
	Base of G.T.R. rail, opposite B.M. DCCCXIII	138·07	138·28
DCCCXIII.	On N. face of culvert, 1,600 ft. W. of mile 39	135·58	135 79
	Base of G.T.R. rail, opposite B.M. 734	141·98	142·19
734	+On boulder 8·85 ft. N. of track and 715 ft. W. of mile 40	140·88	141·09
	Base of G.T.R. rail, crossing	140·74	140·96
	Base of G.T.R. rail, opposite B.M. DCCCXII	137·01	137·24
DCCCXII.	On N. end of W. face of culvert, 195 ft. S. of mile 42	129·96	130·19
	Base of G.T.R. rail, at St. Louis station	135·55	135·78
	Base of G.T.R. rail, at St. Louis station crossing	135·23	135·46
	Base of G.T.R. rail, centre of bridge over St. Louis river	135·71	135·94
DCCCXI.	On N. face of N. pier of G.T.R. bridge over St. Louis river	129·08	129·31
	Base of G.T.R. rail, at crossing, St. Louis	136·28	136·51
	Base of G.T.R. rail, at crossing, St. Louis	140·99	141·23
	Base of G.T.R. rail, at crossing, St. Louis	143·02	143·26
733	On N.W. corner of culvert, 1,580 ft. S. of mile 45	142·38	142·62
	Base of G.T.R. rail, opposite B.M. DCCCX	157·35	157·60
DCCCX.	On N. end of W. face of culvert, opposite mile post 89	153·14	153·39
	Base of G.T.R. rail, opposite B.M. 732	163·19	163·44
732	On boulder, 25 ft. E. of track and 2,000 ft. N. of mile 89	161·05	161·30
	Base of G.T.R. rail, at crossing	163·01	163·27
DCCCIX.	+On W. face of culvert, 355 ft. N. of mile 47	159·80	160·06
	Base of G.T.R. rail, opposite B.M. 731	162·96	163·22
731	+On S. end of culvert 355 ft. N. of mile 47	160·53	160·79
	Base of G.T.R. rail, at Cecile Junction	149·57	149·84
	Base of G.T.R. rail, crossing S. side of Beauharnois canal	153·22	153·49
730	+On E. end of S. abutment of bridge over Beauharnois canal	153·52	153·79
	Base of G.T.R. rail, centre of bridge over Beauharnois canal	153·46	153·73
DCCCVIII.	On S. face of sluice portal, 1¼ miles E. of lock 1	143·44	143·71
	Base of G.T.R. rail, at crossing, N. side of canal	153·35	153·62
	Base of G.T.R. rail, at crossing	149·22	149·49
	Centre of bridge over M.C.C. mills channel	148·22	148·49
DCCCVII.	On E. end of N. abutment of bridge over tail race of M.C.C. mills	142·84	143·11
	Base of G.T.R. rail, at crossing, Valleyfield	149·94	150·21
	Base of G.T.R. rail, opposite B.M. DCCCVI	155·08	155·36
DCCCVI.	On E. face of culvert, E. of Valleyfield iron works crossing	151·33	151·61

Rouses' Point to Montreal, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail at Valleyfield Iron Works crossing	155·49	155·77
DCCCV.	On W. end of Laroque House, Valleyfield	157·23	157·51
	+On coping S. end of lower gates, lock No. 14, Valleyfield	154·34	154·62
	+On coping N. end of lower gates, lock No. 14, Valleyfield	154·30	154·58
	+On coping S. end of upper gates, lock No. 14, Valleyfield	154·36	154·64
729	+On coping, N. end of upper gates, lock No. 14, Valleyfield	154·29	154·57
	Centre of M.C.C. bridge over S. channel, Valleyfield	157·24	157·52
DCCCIV.	On retaining wall S. end of bridge over N. channel, Valleyfield	157·67	157·95
	Centre of M.C.C. bridge over N. channel, Valleyfield	158·00	158·28
	Base of G.T.R. rail crossing, Valleyfield station	158·63	158·91
	Base of G.T.R. rail, Valleyfield station	160.20	160.48
	Base of G.T.R. rail, crossing, Valleyfield	157·70	157·99
DCCCIII.	On N. face of S. abutment of bridge over 3rd channel of St. Lawrence river	171·04	171·34
	Centre of G.T.R. bridge over 3rd channel, St. Lawrence river.	173·72	174·02
DCCCII.	On S. face of N. abutment of bridge over 3rd channel of St. Lawrence river	171·06	171·36
DCCCI.	On N. face of S. abutment of bridge over 2nd channel of St. Lawrence river	171·42	171·72
	Centre of G.T.R. bridge over 2nd channel, St. Lawrence river.	173·85	174·15
DCCC.	On S. face of N. abutment of bridge over 2nd channel of St. Lawrence river	171·42	171·72
DCCXCIX.	On N. face of S. abutment of bridge over steamboat channel of St. Lawrence river	171.36	171·66
	Centre of G.T.R. bridge over steamboat channel of St. Lawrence river	173·89	174·19
DCCXCVIII.	On S. face of N. abutment of bridge over steamboat channel of St. Lawrence river	171·36	171·66
	Base of G.T.R. rail, centre of overhead crossing	174·00	174·30
	Base of G.T.R. rail, centre of overhead crossing, S. side of Soulanges canal	173·99	174·30
	Base of G.T.R. rail, centre of G.T.R. bridge, over Soulanges canal	174·12	174·43
DCCXCVII.	On N. face of N. abutment of G.T.R. bridge over Soulanges canal	174·11	174·42
CCCCXXVIII.	On E. face of overhead crossing of road, N. side of Soulanges canal	160·85	161·17
547	Iron bolt in W. wall of crossing of road, S. side of canal	160·99	161·30
CCCCXXIX.	On N. face of stone block, lower end of bridge over canal	158·76	159·07
	Coping N. end of upper gates of lock 1, Soulanges canal	158·00	158·31
	Coping S. end of upper gates of lock 1, Soulanges canal	157·99	158·30
	Coping S. end of lower gates of lock 1, Soulanges canal	158·02	158·33
	Coping N. end of lower gates of lock 1, Soulanges canal	158·04	158·34
546	Iron bolt in W. wall of crossing of road, N. side of canal	159·44	159·76
	Base of G.T.R. rail over road along N. side of canal	174·09	174·40
	Base of G.T.R. rail, crossing along branch to Valleyfield	159·70	160·01
624	+On coping S.W. corner of highway bridge over Delisle river.	158·40	158·71
DLXXIX.	On W. face of S. abutment of highway bridge over Delisle river	156·43	156·74
	Base of G.T.R. rail, crossing W. shore of Delisle river	160·79	161·10
	Base of G.T.R. rail, centre of bridge over Delisle river	160·88	161·19
DCCCLXIV.	On S. end of E. abutment of bridge over Delisle river	158·83	159·14
	Base of G.T.R. rail, crossing E. shore of Delisle river	160·90	161·21
	Base of G.T.R. rail at Riviere Rouge crossing	161·73	162·04
	Base of G.T.R. rail at Riviere Rouge station	161·34	161·65
DCCCLXIII.	On N. face of W. abutment of bridge over Riviere Rouge	157·74	158·05
	Base of G.T.R. rail, centre of bridge over Riviere Rouge	160·96	161·27
	Base of G. T. R. rail, opposite B.M. DCCCLXII	159·31	159·62
DCCCLXII.	On E. face of N. end of culvert, 15 ft. W. of mile 34	151·11	151·42
	Base of G.T.R. rail, St. Emmanuel crossing	162·96	163·28
	Base of G.T.R. rail, opposite B.M. DCCCLXI	162·72	163·04
DCCCLXI.	On S. end of E. wall of culvert, 40 ft. of mile 33	159·28	159·60
	Base of G.T.R. rail, opposite B.M. DCCCLX	152·03	152·35
DCCCLX.	On S. end of W. wall of culvert, 784 ft. W. of mile 31½	149·59	149·91
	Base of G.T.R. rail at St. Dominique crossing	156·68	157·00
	Base of G.T.R. rail at St. Dominique station	157·20	157·52
	Base of G.T.R. rail at Cedars crossing	159·43	159·75
749	On N. end of E. side of culvert at Cedars station	158·94	159·26
	Base of G.T.R. rail at Cedars station	159·45	159·77
	Base of G.T.R. rail, 1st crossing E. of Cedars station	158·68	159·01
	Base of G.T.R. rail, opposite B.M. DCCCLIX	123·54	123·87
DCCCLIX.	On W. end of E. face of culvert, 193 ft. E. of mile 26½	118·77	119·10
	Base of G.T.R. rail, 2nd crossing E. of Cedars station	119·00	119·33
	Base of G.T.R. rail, opposite B.M. DCCCLVIII	92·05	92·38
DCCCLVIII.	On W. end of S. face of culvert, 1,480 ft. W. of mile 25½	90·97	91·30
	Base of G.T.R. rail, opposite B.M. DCCCLVII	83·79	84·12
DCCCLVII.	On S. end of E. ballast wall of culvert, 735 ft. E. of mile 25.	78·91	79·24
	Base of G.T.R. rail, crossing of road to Cascades village	84·54	84·87

Rouses' Point to Montreal, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
	Base of G.T.R. rail, opposite Vaudreuil station	84·76	85·09
	Base of C.P.R. rail, opposite Vaudreuil station	86·07	86·40
	Base of G.T.R. rail, opposite B.M. DCCCXV	89·63	89·96
CCCCXV.	On S. end of W. abutment, G.T.R. bridge over Ottawa river at Vaudreuil	88·30	88·61
	Base of G.T.R. rail, opposite B.M. CCCCXIV	93·23	93·56
CCCCXIV.	On S. end of E. abutment, G.T.R. bridge over Ottawa river at Vaudreuil	91·94	92·27
	Base of G.T.R. rail, crossing road along W. shore Ile Perrot brook	93·22	93·55
	Base of G.T.R. rail, crossing road along E shore Ile Perrot brook	90·03	90·35
CCCCXIII.	On N.W. face of W. abutment of G.T.R. bridge, Ile Perrot brook	92·01	92·33
	Base of G.T.R. rail, centre G.T.R. bridge, Ile Perrot brook	96·59	96·91
	Base of G.T.R. rail, opposite B.M. CCCCXII	105·27	105·59
CCCCXII.	On N.W. end of W. abutment of G.T.R. bridge over Ottawa river at Ste. Anne de Bellevue	105·54	105·86
	Base of C.P.R. rail, opposite Ste. Anne de Bellevue station	117·75	118·07
	Base of G.T.R. rail, crossing to C.P.R. station	116·76	117·08
	Base of G.T.R. rail, opposite Ste. Anne de Bellevue station	121·22	121·54
	Base of G.T.R. rail, opposite B.M. DCCCLVI	120·37	120·69
DCCCLVI.	On W. end of S. face of C.P.R. culvert, 660 ft. W. of G.T.R mile 20	113·31	113·63
	Base of C.P.R. rail, opposite Bay View station	114·12	114·44
	Base of G.T.R. rail, opposite Baie D'Urfé station	114·12	114·44
	Base of G.T.R. rail, opposite B.M. DCCCLV	113·62	113·94
DCCCLV.	On E. end of S. face of G.T.R. culvert, 123 ft. E. of mile 19	109·01	109·36
	Base of G.T.R. rail, opposite B.M. DCCCLIV	105·76	106·08
DCCCLIV.	On W. end of S. face of G.T.R. culvert, 210 ft. W. of mile 18.	97·93	98·25
	Base of C.P.R. rail, opposite Beaurepaire station	106·85	107·17
	Base of G.T.R. rail, opposite Beaurepaire station	105·64	105·96
	Base of G.T.R. rail, opposite culvert, opposite G.T.R. mile 17.	93·82	94·14
DCCCLIII.	On E. end of S. face of C.P.R. culvert, opposite G.T.R. mile 17.	83·66	83·98
	Base of G.T.R. rail, opposite B.M. DCCCLII	105·56	105·87
DCCCLII.	On W. wall of G.T.R. culvert, 872 ft. E. of mile 16	102·40	102·71
	Base of G.T.R. rail, opposite Beaconsfield station	105·13	105·44
	Base of C.P.R. rail, opposite Beaconsfield station	106·95	107·26
	Base of G.T.R. rail, opposite Beaconsfield crossing	104·97	105·28
	Base of G.T.R. rail, opposite B.M. DCCCLI	103·09	103·40
DCCCLI.	On E. end of N. face of G.T.R. culvert, 745 ft. S. of mile 15	96·62	96·93
	Base of G.T.R. rail at Pointe Claire station	108·11	108·42
	Base of C.P.R. rail at Cedar Park station	111·71	112·02
	Base of G.T.R. rail at crossing	103·71	104·02
	Base of G.T.R. rail at Lakeside station	96·88	97·18
	Base of C.P.R. rail at Lakeside station	96·71	97·01
	Base of G.T.R. rail at Lakeside crossing	96·58	96·88
	Base of G.T.R. rail, culvert 1,610 ft. W. of mile 13	96·32	96·62
DCCCL.	On E. end of S. face of culvert, 1,610 ft. W. of mile 13	89·13	89·43
	Base of G.T.R. rail, centre of G.T.R. culvert, 220 ft. W. of Valois station	90·13	90·43
CCCCI.	On S. base of W. wall of G.T.R. culvert, 220 ft. W. of Valois station	73·86	74·16
	Base of G.T.R., opposite Valois crossing	89·60	89·90
	Base of G.T.R., opposite Valois station	89·78	90·08
	Base of C.P.R. rail, opposite Valois station	89·14	89·44
	Base of G.T.R. rail, opposite B.M. DCCCXLIX	89·24	89·54
DCCCXLIX.	On W. face of wall of culvert, 511 ft. E. of mile $12\frac{1}{2}$	77·68	77·98
	Base of G.T.R. rail, opposite Strathmore crossing	89·44	89·74
	Base of G.T.R. rail, opposite Strathmore station	89·42	89·72
	Base of G.T.R. rail, opposite B.M. DCCCXLVIII	88·70	89·00
DCCCXLVIII.	On W. end of N. face of culvert, 585 ft. E. of mile $11\frac{1}{2}$	86·09	86·39
CCCXCVIII.	On rear base, W. side of Dorval R. C. church	93·55	93·85
	Base of G.T.R. rail, opposite Dorval crossing	85·26	85·56
	Base of G.T.R. rail, opposite Dorval station	85·25	85·55
	Base of C.P.R. rail, opposite Dorval station	89·01	89·31
	Base of G.T.R. rail, opposite B.M. 747	88·75	89·05
747	On S.E. peak of culvert, 171 ft. W. of mile $9\frac{1}{2}$	87·88	88·18
DCCCXLIII.	On S.E. face of W. wall of culvert, 171 feet W. of mile $9\frac{1}{2}$	80·61	80·91
	Base of G.T.R. rail, opposite Dixie station	95·97	96·26
	Base of G.T.R. rail, opposite Dixie crossing	96·63	96·92
	Base of G.T.R. rail, opposite B.M. DCCCXLII	97·68	97·97
DCCCXLII.	On S.E. face of culvert, 1,520 feet E. of mile 9, W. of Montreal.	92·65	92·94
	Base of G.T.R. rail, opposite culvert, 905 feet W. mile 8, W. of Montreal	86·08	86·37
DCCCXLI.	On S.W. face of G.T.R. culvert, 905 feet W. of mile 8, W. of Montreal	82·90	83·19

SESSIONAL PAPER No. 19a

Rouses' Point to Montreal, &c.—Complete List of Bench Marks, &c.—*Continued.*

Bench Marks.	Location and Description.	Elevations.	
		Instrumental.	Adjusted.
746	On S.W. corner of G.T.R. culvert, 905 feet W. of mile 8, W. of Montreal	85·53	85·82
	Base of G.T.R. rail, opposite Lachine main station	80·20	80·49
CCCXCVI.	On S.E. corner of McRae's house on Lachine Rd., to Lachine wharf	79·20	79·49
	Base of G.T.R. rail, crossing of Electric Ry., branch to Lachine wharf	75·36	75·65
745	On N.W. peak of culvert 1,820 feet E. of mile 8, W. of Montreal	77·15	77·44
	Base of G.T.R. rail, opposite B.M. DCCCXL	77·13	77·42
DCCCXL.	On E. face of W. wall of culvert, 1,820 feet E. of mile 8, W. of Montreal	72·59	72·88
	Base of G.T.R. rail, 18th Avenue crossing, Lachine	77·05	77·34
	Base of G.T.R. rail, opposite convent, Lachine	76·86	77·15
	Base of G.T.R. rail, opposite Dominion station, Lachine	76·55	76·84
DC.	On W. end of S. face of guard wall, S. end of Curran bridge, Montreal	54·66	54·90
DCCCXLVII.	On N.W. corner, foundation of freight shed, close to track, Mountain St.	46·69	46·95
	Base of G.T.R. rail at Mountain St. crossing, Montreal	45·76	46·02
	Base of G.T.R. rail at Richmond St. crossing, Montreal	45·68	45·94
DCCCXLVI.	On E. base, front of St. Cunégonde R.C. church, Montreal	55·54	55·80
	Base of G.T.R. rail, opposite St. Henri station	59·84	60·10
DCCCXLV.	On S. foundation of J. Duffy's house, St. Philippe street	63·86	64·12
	Base of G.T.R. rail, Côte St. Paul Rd. crossing	62·24	62·52
	Base of G.T.R. rail, opposite B.M. DCCCXLIV	60·70	60·98
DCCCXLIV.	On boulder, 12 feet N. of track and 405 feet E. of Montreal W. station	59·77	60·05
	Base of G.T.R. rail, opposite Montreal W. station	60·87	61·15
	Base of G.T.R. rail, opposite B.M. 748	61·88	62·16
748	On boulder, 15·4 feet N. of track, 435 feet E. of mile 5, W. of Montreal	58·78	59·06
	Base of G.T.R. rail at Rockfield station crossing	70·81	71·10
	Base of G.T.R. rail at Rockfield station	71·47	71·76
DCCCXXXIX.	Base of S. wall of C.P.R. crossing of G.T.R., Rockfield	76·15	76·44
	Base of G.T.R. rail, centre of crossing, under C.P.R., Rockfield	72·77	73·06
	Base of C.P.R. rail, centre of crossing of G.T.R., Rockfield	105·24	105·53
744	On W. end of S. wall of C.P.R. crossing of G.T.R., Rockfield.	105·15	105·44
	Base of C.P.R. rail, centre of overhead crossing of Lachine Rd.	105·01	105·30
	Base of C.P.R. rail, centre of swing bridge over Lachine canal.	108·13	108·42
DLXXXI.	On W. face of S. pier of C.P.R. swing bridge over Lachine canal.	74·53	74·81
743	On S.W. end of S. abutment of C.P.R. swing bridge over Lachine canal	109·12	109·40
	Base of C.P.R. rail at Highlands station, Lachine, P.Q	115·88	116·11
	Base of C.P.R. rail, centre of C.P.R. crossing of Lachine lower road	121·90	122·18
CCCXCIII.	On W. side of first pier of C.P.R. bridge, Lachine	93·85	94·13

FRENCH RIVER.

LIST OF PERMANENT BENCH MARKS SET ALONG FRENCH RIVER, BETWEEN NORTH BAY TOWN AND FRENCH RIVER VILLAGE ON GEORGIAN BAY.

ELEVATIONS BASED ON CHALONER'S DETERMINATION OF THE "CHIPPEWA" BENCH MARK AT NORTH BAY—649·86 ABOVE MEAN SEA LEVEL.

This elevation was carried to Frank's Bay across Lake Nipissing by water level transfer as deduced from simultaneous gauge observations at both places.

The canal levels for the French river, as shown on plan, are based on the elevations as published below and are not therefore subject to the corrections mentioned at the beginning of this report.

In the following list column No. 1 gives the Bench Marks set by this survey. Column No. 2 gives the Bench Marks set by the late J. W. Fraser during his survey in 1891. All his elevations have been reduced to the above mentioned datum.

The total length of this line from North Bay to Georgian Bay is 81 miles.

The levelling was done with the greatest care by Mr. F. H. Peters, Engineer for the Lake Nipissing work, under the direction of the District Engineer, S. J. Chapleau.

SESSIONAL PAPER No. 19a

(All Bench Marks are marked with cold chisel in rock, as well as paint.)

G.B.S.C.S. Number.	Fraser. Number.	Locality and Description.	Elevation.
1	1	Frank's Bay, on ledge of rock 50′ from shore end of wharf north side —— 1 (in yellow paint)	648·18
	2	Near east end of Partridge Island, on south side, in rock, marked 2 ledge —— , yellow paint	647·80
	4	On rock, south side, about ½ mile above Chaudiere portage and near junction of ledge of rock and plateau, marked 4 —— yellow paint.	650·177
2	.....	Drilled semi-circle around point of rock, about 150′ south of pine stump, marked △38. On point of island, separated from Chaudiere island by small channel to Dukes bay	643·69
	5	On rock, right side of Chaudiere portage and about 100′ from west end, marked —— 5, yellow paint	651·059
	9	On rock, at mouth of Restoul river, on east side. Tree in front of it cut off, flattened on face and two sides, with two cut branches left on top. Blazed faces, painted yellow. Yellow 9 in rock and ↑	624·202
8	.....	On small island, west of mouth of Restoul river, on south shore. On root of tree, which is also △	620·996
9	.....	On point of rock on south shore on point west of Hales group of islands. Painted white	615·076
10	.....	On ledge of rock on south side of small island on which is △ = 61, and separated from point by small channel	615·649
11	.....	On white pine tree, on east side of point on which is △ =71. About ½ mile above Little Pine rapids, on east side of south channel	619·764
	10	At head of Little Pine rapid, on left side, on high rock. Broad cut in rock under point and 10 painted on rock in yellow	624·918
12	.....	On rock, on point, on right side, opposite little island about 2,000′ below Big Pine rapid, marked 12. Red paint; visible from river	610·790
13	.....	On rock, at head of Big Parisian rapid, on right side, marked ↗ 13, in red paint; visible from river	607·958
14	.....	On rock, on left of large island (Big Bluff island), above current, below Big Parisian rapid, about 90′ down from up stream point. Marked ↗ 14, in red paint; visible from river	605·840
15	.....	On point of rock, right side, about 1,500′ above Little Parisian rapid, marked ↑ 15, in red paint; visible from river	600·637
16	.....	On high point of rock, on right side, about 1¾ miles below Little Parisian rapid, marked →↑← 16, in red paint; visible from river	601·094
17	.....	On side of steep rock, in inche on right side of south channel into Dry Pine lake, about 300′ up from point of channel on left at Dry Pine lake. Marked ↘ 17, in red paint; visible from river	600·910
18	.....	On rock, on left side of river, about 1,500′ above Recollet rapid. About 500′ above very high walled cliff, on right side, which is just above rapid. Marked ↗ 18, in red paint. Also, 10′ down stream, on small white birch stump, is sign-board with red paint. Marked B.M. 18; visible from river	600·805
	16	On left side of river at foot of Recollet falls, on point of rock. Marked 16, in yellow paint	593·176
19	.....	On small point, on rock, right side of river, about 300′ below small rock island, which is in sharp bend to right, ¾ mile above head of Potvin's island. Marked ↑ 19, in red paint; visible from river	590·266
	18	At second rapid, below Recollet rapid, on rock on right side, opposite little island. Marked ↑ 18, in yellow paint	594·146
20	.....	On rock, on rock point on right, 1,500′ below second rapid, below Recollet rapid. Marked ↘ 20, in red paint; visible from river	589·564
21	.....	On rock, on right side 3,500′ below head of swift current, below second rapid. Marked ↑ 21, in red paint; visible from river	589·682
22	.....	On rock, on right side of small bay on right side at junction of French river and Pickerel river, straight in from large island. Marked ^ 22, in red paint; visible from water	590·415
23	.....	On sloping face of rock, on right side of little bay on right side of main channel, just up stream 1,000′ from where main channel turns sharp to right to Dalles rapid	592·357
	19	At head of Dalles rapid, on left side on rock	591·908
	20	On point of rock, left side of river, about 200′ below point where river turns south to French River village. Marked ↑ 20, in yellow paint.	586·260
24	.....	On rock, on left side of river. Marked · 24, in red paint. About 1,580′ below head of swift, below Dalles rapid	585·423
26	.....	'Peter's B.M.' top of iron ring bolt, set in solid rock about 250′ southwest of Ontario Lumber Co.'s dock	590·628
25	.....	Point of rock removed about 15′ from ring bolt and nearer river. Marked ↑ 22, in red paint	587·467

MEAN TIDE AT QUEBEC.

The following information and deductions with regard to Mean Sea Level at New York compared with its determination at Quebec, as made by Dr. W. Bell Dawson from the Tidal Survey observations at the Dry Dock at Levis, will prove of interest.

The tidal observations have been obtained by a registering tide gauge, giving a continuous record day and night throughout the year, and reduced to a uniform datum.

The comparison is based upon the elevations of the sill of Old Lock No. 1 of the Lachine Canal, at the head of Montreal Harbour; where the levels meet which have been carried through from New York via Rouses' Point, and along the St. Lawrence from Quebec by Mr. R. Steckel.

Dr. Dawson, who is in charge of the Tidal and Current Survey for the Department of Marine and Fisheries, has reduced these levels to the Admiralty Low Water datum at Quebec, as used for the chart of Quebec Harbour. This datum has also been adopted by the Tidal Survey as the plane of reference for the Quebec Tidal Tables. It is defined by the Admiralty in their own publications, as 28·00 feet below the Bench Mark cut on the east side of the principal gateway to the Marine and Fisheries building in Quebec.

The various connections by means of which the reductions are made, are as follows:— From the Admiralty Bench Mark in Quebec to the Levis Dry Dock where the Tide Gauge is situated, connected by Mr. Steckel's levels across the river; one of his Bench Marks being set in the masonry of the dry dock. From Levis to Montreal, connected by Mr. Steckel's levels. From Montreal to Rouses' Point, from the levels of the Georgian Bay Canal Survey, which there connect with the United States Coast Survey levels from New York. The elevation taken for the Coast Survey Bench Mark at Rouse's Point is the revised value of 1903. The difference between Mr. Steckel's datum and that of the Georgian Bay Canal Survey, is based on a common Bench Mark at St. Lambert.

Admiralty bench mark at Quebec, as above described.....	28·00
Sill of old lock No. 1, Lachine canal. Difference of level as determined by Mr. R. Steckel, 15·50 feet above the Admiralty bench mark at Quebec. Resulting elevation.....	12·50
Mean sea level, or half tide at Quebec, as determined at the Levis dry dock; from the hourly ordinates of the tide during eight years of continuous observations, from 1894 to 1902. Mean of the eight years, 8·584 feet above the Admiralty datum.....	8·58
(The value adopted by the Royal Engineers in 1864, for mean sea level in Quebec Harbour, was 8·72 feet above the Admiralty datum. This would be some distance above the dry dock).	
Mean sea level at New York determined by the Georgian Bay Canal Survey, as 5·38 feet below the sill of old lock No. 1, Lachine canal.....	7·12
Steckel's datum referred to the Admiralty datum: the elevation of the Admiralty bench mark above his datum, being 27·039 feet.....	0·96
Admiralty low water datum at Quebec; adopted as the datum for the tidal survey.....	0·00

It thus appears that mean sea level or half tide at Quebec, when accurately determined by tidal observations, is 1·46 feet above mean sea level at New York.

ELEVATIONS ABOVE MEAN SEA LEVEL OF LOW WATER SURFACE AT DIFFERENT POINTS ALONG THE PROPOSED GEORGIAN BAY SHIP CANAL ROUTE, AS BASED ON PRECISE LEVEL LINES.

St. Lawrence River, at Bout de l'Ile	16·0
Montreal Harbour, opposite Custom House	19·0
St. Lawrence River at Victoria Bridge (Approx.)	25.0
St. Lawrence River foot of Lachine Rapids (opposite Crawford's, Verdun)	35.0
St. Lawrence River head of Lachine Rapids (Head Race M. L.H. & P. Co.)	59·5
Lake St. Louis (Lachine)	66·0
Ottawa River, St. Anne de Bellevue	66·7
Lake of Two Mountains	70·0

RIVIERE DES PRAIRIES.

River St. Lawrence, Bout de l'Ile	16·0
Rivière des Prairies Village (below Rapid)	18·4
Rivière des Prairies Village (above Rapid)	25·4
Sault au Recollet (foot of second Rapid)	26·8
Sault au Recollet (head of second Rapid)	38·5
Sault au Recollet, Viau Bridge	42·0
Sault au Recollet, foot of first Rapid)	42·5
Sault au Recollet (head of first Rapid)	52·0
Cartierville Bridge	54·0
White Horse Rapid (foot)	54·7
White Horse Rapid (head)	58·7
Dutchmen's Rapid (foot)	62·2
Dutchmen's Rapid (head)	70·0

Carillon Canal (lower)	70·2
Carillon Canal (upper)	83·6
Grenville Canal (lower)	84·7
Grenville Canal (upper)	127·8
East Templeton	128·4
Ottawa (Rideau Locks)	129·3
Booth's head race	167·6
Little Chaudière Rapids	176·5
Remicks Rapid	180·2
Deschènes Rapid (foot)	180·8
Deschènes Rapid (head)	190·7
Deschènes Lake, Fitzroy Harbour	190·8
Chats Falls (above)	239·4
Arnprior	239·6
Cheneaux Rapids (foot)	239·8
Cheneaux Rapids (head)	240·2
Portage du Fort (foot)	240·7
Portage du Fort (head)	255·4
Sable Rapid (foot)	256·8

ELEVATIONS above Mean Sea Level of low water surface, &c. *Continued.*

Sable Rapid (head)	263.0
Mountain Chute (foot)	264·0
Mountain Chute (head)	278·5
D'Argis Rapid (foot)	278·7
D'Argis Rapid (head)	284·7
Calumet Rapid	285·1
Bryson	342·1
La Passe or Lower Point	343·4

ROCHER FENDU CHANNEL.

Head of Portage du Fort	255.4
Rocher Fendu Chute (foot)	256·0
Rocher Fendu Chute (head)	260·0
Flat Rapid (foot)	260·1
Flat Rapid (head)	261·1
Long Rapid (foot)	262·2
Long Rapid (head)	277·7
La Barriere Rapid (foot)	277·8
La Barriere Rapid (head)	278·5
Muskrat Rapid (foot)	279·1
Muskrat Rapid (head)	286·8
Garvins Chute (foot)	298·7
Garvins Chute (head)	323·0
Des Jardins Rapids (foot)	323·6
Des Jardins Rapids (head)	336·0
Foot of dam	338·7
Head of dam	343·2
Paquette Rapid (foot)	344·0
Paquette Rapid (head)	352·0
Allumette Rapid (foot)	352·4
Allumette Rapid (head)	365·1
Pembroke	365·3
Des Joachims Rapids (foot)	365·5
Des Joachims Rapids (head)	390·5

CULBUTE CHANNEL.

Paquette Rapid (foot)	344·0
Chapeau	344·5
Culbute Chute (foot)	344·8
Culbute Chute (head)	365·0
Fort William	365·4

Rockliffe	391·2
McSorley's Rapid (foot)	393·0
McSorley's Rapid (head)	396·3
Mirabeau Rapid (foot)	393·5
Mirabeau Rapid (head)	398·8
Rocher Capitaine Rapid (foot)	398·9
Rocher Capitaine Rapid (head)	441·4
Doyles' Rapid (foot)	441·7

ELEVATIONS above Mean Sea Level of low water surface, &c.—*Concluded.*

Doyles' Rapid (head)	442·8
Deux Rivières Rapid (foot)	443.1
Deux Rivières Rapid (head)	457·2
Trou Rapids (foot)	457·7
Trou Rapids (head)	464·8
La Veillee Rapids (foot)	467·4
La Veillee Rapids (head)	474·2
1½ miles east of Klock	475·6
Klock (foot of Rocky Farm Rapids)	476·9
Rocky Farm Rapids (head)	479·0
Burritt's Rapids (foot)	480·0
Burritt's Rapids (head)	482·0
Mattawa (foot of Johnson's Rapids)	483·0
Johnson's Rapids (head)	487·4
Boom Lake	496·8
Lake Plain Chant	517·7
Head of Les Epines Rapids	519·7
Head of Les Roses Rapids	526·1
Bouleau Lake	532·1
Foot of Deep River	532·6
Paresseux Falls (foot)	532·7
Paresseux Falls (head)	570·6
Talon Chute (foot)	589·0
Talon Lake	633·2
Falon Lake	637·2
Whitefish Lake	639·7
Moose Pond	658·4
Wolfe Pond	659.2
Turtle Lake	662·8
Trout Lake	662·9
Lake Nipissing (North Bay)	638·2
Chaudière Falls (below)	614·0
Restoul River	613·2
1st W. L below Little Pierre	611·0
2nd W. L. below Little Pierre	610·6
Big Pierre Rapid (head)	609·4
Big Pierre Rapid (foot)	604·9
Double Rapid Current (head)	604·8
Double Rapid Current (foot	604·5
Double Rapid (head)	604·5
Double Rapid (foot	601·1
Parisian Rapid (head)	600·3
Parisian Rapid (foot)	596·6
Little Parisian Rapid (foot)	594·2
Little Parisian Rapid (head)	595·2
Horseshoe (below	584·0
Dalles Rapid (head)	583·8
Dalles Rapid (foot)	579·4
Georgian Bay	578·5

CONCLUSION.

The condensed information and elevations as contained in this report are given in the hope that the whole may be of some benefit to the other technical branches of the Government and to the engineering profession.

This part is published separately from the main report on the proposed Georgian Bay ship canal, in order that the information regarding this important branch of our work should be more readily available.

Respectfully submitted,

A. ST. LAURENT,

Assistant Chief Engineer and Engineer in charge.

Approved,

EUGENE D. LAFLEUR,

Chief Engineer.

INDEX

OF

PLACES WHERE BENCH MARKS HAVE BEEN LOCATED.

A.

B.

INDEX of Places where Bench Marks have been located *Continued.*

C.

D.

E.

INDEX of Places where Bench Marks eave been located—*Continued.*

F.

G.

H.

I.

J.

INDEX of Places where Bench Marks have been located—*Continued.*

K.

L.

M.

Mc.

N.

INDEX of Places where Bench Marks have been located—*Continued.*

N.—*Concluded.*

INDEX of Places where Bench Marks have been located—*Continued.*

S

ST.

T.

INDEX of Places where Bench Marks have been located—*Concluded.*

U.

V.

W.

Y.